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UK METEOROLOGICAL OFFICE
GLOBAL DATA MONITORING REPORT

July 2002

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1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis (the current cut-off time is approximately 7.2 hours after each analysis time). The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background) field, although to provide background values valid at the observation time for non-main hour data, time-interpolation of the T+3, T+6 and T+9 forecasts is used; and for sea surface temperature the background field is the analysis from the previous day. Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

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2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1and 2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or sea surface temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. All data are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At the UK Met. Office, we monitor SYNOP pressure after it has been interpolated to our Global NWP Model's surface height. For most synoptic stations (about 75%), the surface pressure (at the model surface) is calculated from the reported station-level pressure, or, if this is not available, the height of a standard pressure-level (e.g. 850 hPa or 700 hPa). If neither of these are available, or if the reported station-level pressure is deemed unreliable, the reported mean sea-level pressure is used (about 25% of SYNOPs).

Aircraft observations

Tables 4A (300-150 hPa) and 4B (1000-301 hPa) contain lists of statistics calculated from data received from all airline carriers.

Figures 3A (300-150 hPa) and 3B (1000-301 hPa) show 10 degree lat/long box average numbers of aircraft reports in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS) received per day throughout the month at Bracknell and assimilated into model runs. Observations with a vector wind difference (compared with the model background field) of >60 m s^{-1} have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4A-7A (300-150 hPa) and 4B-7B (1000-301 hPa) show wind statistics for AIREP/ASDAR in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS). Observations with a vector wind difference > 60 m s^{-1} have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure	Parameter
4	Mean wind vectors
5	Mean observation - background wind vector
6	Mean observation-background speed (m s^{-1})
7	RMS observation-background vector (m s^{-1})

Radiosonde Observations

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-39 show sounding statistics from the polar orbitting satellite NOAA-15. Figure 25 shows the mean daily number of ATOVS soundings, and figures 26-39 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.
N.B. The sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

Figure		Weighting function peak (hPa)
26	Mean	Surface (HIRS8)
27	SD	Surface (HIRS8)
28	Mean	700 (HIRS15)
29	SD	700 (HIRS15)
30	Mean	500-700 (HIRS11)
31	SD	500-700 (HIRS11)
32	Mean	400 (HIRS4)
33	SD	400 (HIRS4)
34	Mean	700 (AMSUA5)
35	SD	700 (AMSUA5)
36	Mean	300 (AMSUA7)
37	SD	300 (AMSUA7)
38	Mean	100 (AMSUA9)
39	RMS	100 (AMSUA9)

Figures 40-54 show sounding statistics from the polar orbitting satellite NOAA-16. Figure 40 shows the mean daily number of ATOVS soundings, and figures 41-54 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.
N.B. The sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

Figure		Weighting function peak (hPa)
41	Mean	Surface (HIRS8)
42	SD	Surface (HIRS8)
43	Mean	700 (HIRS15)
44	SD	700 (HIRS15)
45	Mean	500-700 (HIRS11)
46	SD	500-700 (HIRS11)
47	Mean	400 (HIRS4)
48	SD	400 (HIRS4)
49	Mean	700 (AMSUA5)
50	SD	700 (AMSUA5)
51	Mean	300 (AMSUA7)
52	SD	300 (AMSUA7)
53	Mean	100 (AMSUA9)
54	RMS	100 (AMSUA9)

3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics (**Geopotential Height and Windspeed at 100 and 500 hPa**) for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

Revisions

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. April 96. 500 km and 120 km SATEMs replaced by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS.
6. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
7. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
8. January 1998. Increase in resolution of UKMO global forecast model.
9. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.
10. June 1998. Monitoring statistics for Meteosat-6 were replaced by monitoring statistics for Meteosat-7, from 3rd June.
11. June 1998. Corrections in our processing of radiosonde data resulted in a decrease in the number of 500hPa geopotential heights in Figure 8 of about 230 per 24 hours (compared with previous reports), and a small increase in the number of 300hPa winds in Figure 9.
12. July 1998. Meteosat-5 began transmitting winds from 2nd July, at 63 degrees East (over the Indian ocean), and this data is included in the statistics.
13. July 1998. GOES-9 (at 135W) was replaced mid-month by GOES-10 (initially at 105W, moving towards 135W).
14. February 1999. Problems with NOAA-11, and TOVS data ceased to be assimilated from 26 February.
15. March 1999. UKMO introduced 3-D VAR assimilation system on 29 March, and also began assimilating ATOVS data from NOAA-15.
16. May 1999. Included statistics for ATOVS sounding data from NOAA-15.
17. September 1999. Included statistics for high resolution visible winds from Meteosat-5 and Meteosat-7.
18. October 1999. The 3-D VAR assimilation system was upgraded on 19 October, including improvements in the assimilation of ATOVS radiances, use of SSM/I surface wind speed, an improvement in the calculation of surface pressure for SYNOPs, and thinning and revision of observation errors of aircraft data.
19. November 1999. High resolution visible winds from Meteosat-5 and Meteosat-7 removed until used operationally.
20. April 2000. Aireps in Table 4 and Figures 3-7 split into ranges 300-150 hPa (A) and 1000-301 hPa (B).
21. September 2000. Corrected an error affecting the mean positions of a minority of buoys in Table 2.
22. November 2000. An error in the production of Table 6 was corrected. Previously, some sondes with suspect vector winds were being missed.
23. April 2001. Included statistics for ATOVS sounding data from NOAA-16.
24. May 2001. Included statistics for sea surface temperatures from marine surface observations.

TABLE 1

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH: July 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for ships, fixed buoys and platforms.

Standard of comparison :Background field from UKMO global model.

Observation times :00, 06, 12, 18 UTC

Elements monitored
:Mean sea level pressure (hPa).
:Wind speed (m s^{-1}).
:Wind direction (Degrees).
:Sea surface temperature (Degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:PGE :Percentage of observations with gross errors.

:%REJ :Percentage of observations flagged excluding those with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the wind observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT
:15 hPa (pressure)
:25 m s^{-1} (vector wind)
:10 degrees (sea surface temperature)

SELECTION CRITERIA :NOBS ≥ 20 , and one or more of the following:

1.|bias|
≥ 4 hPa (pressure),
≥ 5 m s^{-1} (wind speed),
≥ 30 degrees (direction).
≥ 3 degrees (sea surface temperature).

2.SD
≥ 6 hPa (pressure),
≥ 80 degrees (direction).
≥ 5 degrees (sea surface temperature).

3.PGE ≥ 25

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE							
A7EC	P	25	0	60	1.3	4.1	4.3
BBXX KS0	P	430	0	100	3.6	5.8	6.9
CG2556	P	25	0	100	0.7	-10.2	10.2
C6QK	P	21	0	0	1.4	8.5	8.6
DEOF	P	28	25	100	5.9	-6.8	9.0
ELYP8	P	41	0	37	6.3	2.1	6.6
ELZF7	P	39	0	100	1.0	6.3	6.4
KS000	P	160	0	56	1.1	11.4	11.4
KS006	P	129	0	0	0.6	7.4	7.5
KS010	P	177	0	21	0.6	4.2	4.2
KS012	P	182	0	2	1.2	5.8	5.9
LADQ4	P	27	4	26	1.8	-4.0	4.4
LAON4	P	57	0	44	0.8	-4.5	4.6
OWDD	P	33	3	9	2.3	-4.4	5.0
PFBE	P	29	0	97	1.0	-5.6	5.7
PJIB	P	30	27	97	3.7	10.4	11.1
P3YS5	P	75	0	0	1.6	4.8	5.0
SGIX	P	45	0	56	1.7	-4.1	4.4
UBAU	P	55	0	2	1.0	-4.7	4.8
UCDP	P	28	36	39	1.5	-1.8	2.4
UCJB	P	30	0	3	1.3	-4.6	4.8
UCJL	P	25	0	96	1.0	6.0	6.1
UCSS	P	20	100	100			
UCUE	P	29	0	0	1.4	-4.0	4.2
UCUO	P	24	21	46	3.5	-4.2	5.5
UDUR	P	24	71	100	1.3	13.4	13.5
UHLE	P	39	3	77	3.1	-9.1	9.6
VCLX	P	22	100	100			
V7CY9	P	85	1	41	2.3	-5.7	6.1
YCTJ	P	57	68	100	1.0	10.9	11.0
ZCBN5	P	22	0	64	4.2	-4.2	5.9
48092	P	24	100	100			
62202	P	23	0	74	2.9	5.0	5.8
63109	P	28	0	43	6.6	0.7	6.7
8PNI	P	29	0	0	0.9	-4.2	4.3

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
WIND SPEED							
C6LQ3	SPEED	43	0	65	4.2	8.2	9.2
ELYB2	SPEED	22	0	50	3.8	6.2	7.3
ELYJ2	SPEED	47	0	23	5.3	6.0	8.0
HP6038	SPEED	239	0	52	3.4	5.3	6.2
PPSO	SPEED	26	0	100	5.5	7.1	9.0
P3EK7	SPEED	47	0	55	3.9	5.5	6.8
P3JZ2	SPEED	20	0	30	7.2	6.5	9.7
ZCAN3	SPEED	35	54	100	6.3	11.0	12.6
ZCBH9	SPEED	47	0	77	3.6	10.3	10.9
3FMM6	SPEED	68	0	63	4.6	10.1	11.1
44145	SPEED	234	0	57	3.9	6.5	7.6

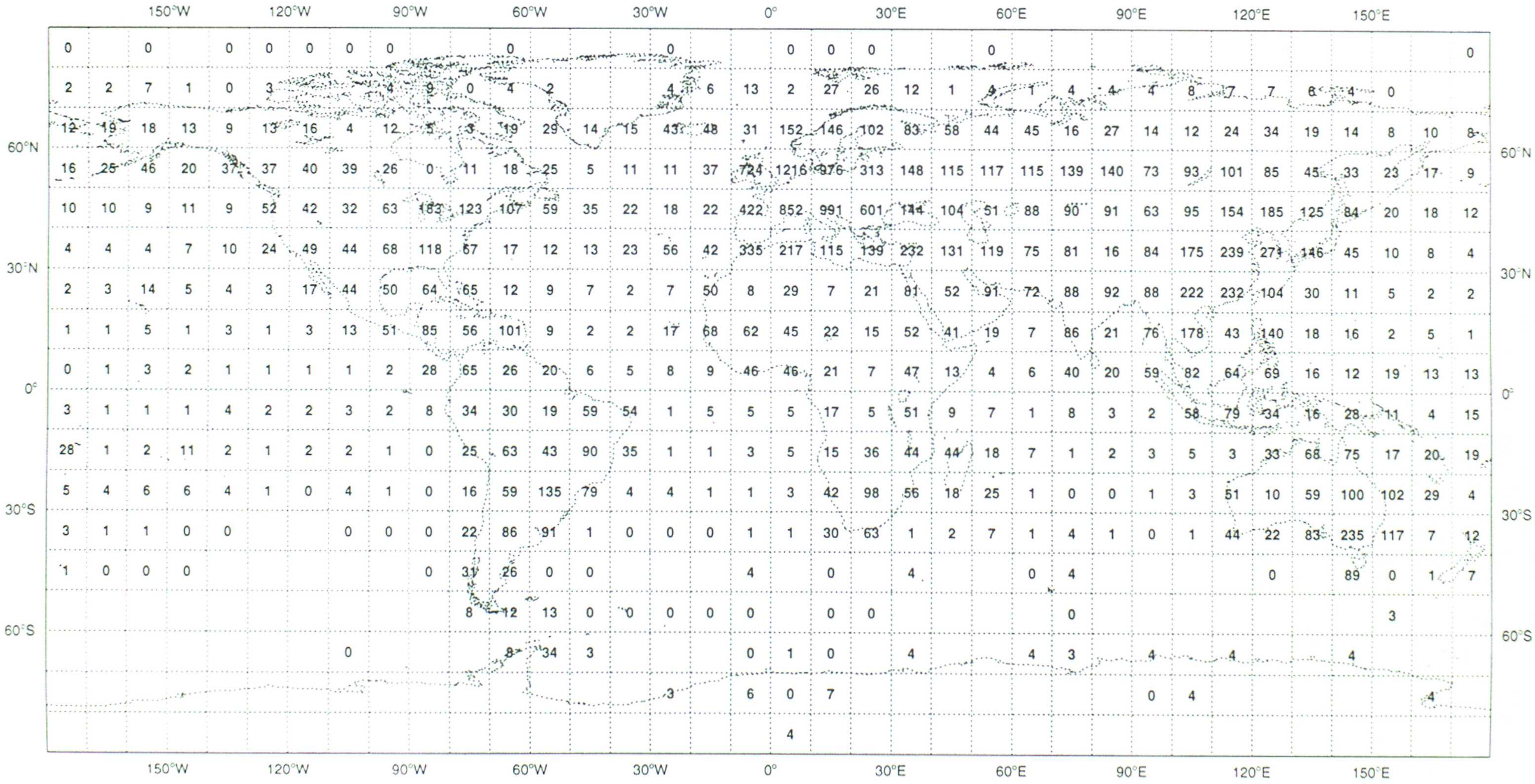
IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
WIND DIRECTION							
C6NR5	DIRN.	25	0	0	36.1	30.1	47.0
ELWX5	DIRN.	204	0	0	28.1	-31.9	42.6
VCLM	DIRN.	62	0	0	86.2	38.4	94.4
ZCAN3	DIRN.	27	70	0	90.0	48.7	102.4
ZCBH9	DIRN.	35	0	0	20.2	46.4	50.6
23102	DIRN.	44	0	0	20.6	-36.7	42.1
52007	DIRN.	26	0	0	96.3	-24.8	99.5

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
SEA SURFACE TEMPERATURES							
A7EC	SST	25	0	88	1.1	4.9	5.0
CGDS	SST	274	18	81	2.4	3.9	4.6
CGDX	SST	380	29	76	1.5	1.5	2.1
CGTF	SST	21	14	33	1.3	3.3	3.5
CG2522	SST	235	100	100			
CG8048	SST	63	98	100	0.0	-7.7	7.7
C6QO9	SST	32	0	100	1.3	4.7	4.9
DGNB	SST	690	33	87	1.3	1.3	1.8
ELZF7	SST	30	0	33	4.3	3.1	5.3
FNJI	SST	110	0	14	1.3	3.0	3.2
H9GW	SST	25	4	100	0.8	4.1	4.2
H9RS	SST	27	4	100	1.1	4.9	5.0
J8JW7	SST	33	0	100	1.0	4.3	4.4
KDBG	SST	30	0	100	1.4	3.0	3.3
KMCB	SST	44	30	34	2.4	-0.7	2.5
KRHX	SST	35	0	40	1.8	-3.4	3.8
KS000	SST	161	37	74	2.1	0.9	2.2
MXPR2	SST	24	0	25	1.0	-3.3	3.5
MZIF7	SST	29	0	72	1.4	-4.2	4.4
OUGY	SST	45	0	33	2.3	3.0	3.8
PCQL	SST	39	0	46	0.6	-3.5	3.5
PDYX	SST	34	0	26	1.1	-3.2	3.4
TSLN	SST	156	1	45	1.0	-3.9	4.0
UASU	SST	30	0	100	0.6	-6.0	6.1
UCBP	SST	27	0	56	1.9	-4.6	4.9
UCUP	SST	24	0	100	0.9	-6.2	6.3
VCLM	SST	445	37	100	1.9	1.5	2.4
VGJC	SST	39	33	67	2.7	0.7	2.8
VGLZ	SST	28	100	100			
VOCJ	SST	246	0	100	1.4	3.3	3.6
VRRB	SST	43	2	100	1.2	-3.4	3.6
WCW9126	SST	45	89	89	0.5	0.9	1.1
WDCJ	SST	22	0	55	2.3	-3.6	4.3
ZCBQ2	SST	43	5	81	2.2	5.4	5.9
23094	SST	59	0	63	1.5	-3.3	3.6
3FMM6	SST	70	0	77	0.9	-3.9	4.0
45002	SST	249	0	65	2.0	3.3	3.9
45006	SST	248	0	60	2.1	3.6	4.1
45140	SST	226	100	100			
45141	SST	339	60	100	1.5	7.6	7.8
45145	SST	453	100	100			
45147	SST	691	100	100			
45148	SST	165	100	100			
45150	SST	76	18	100	0.9	6.4	6.5
45152	SST	739	100	100			
45154	SST	740	1	100	1.5	3.3	3.6
46072	SST	404	0	58	1.4	-3.1	3.4
46131	SST	741	100	100			
46146	SST	530	100	100			
46181	SST	741	100	100			

Figure 1. SHIP/SYNOP mean daily count. JULY 2002

Main hours only

Global average number of observations in 24 hours = 21221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60°N
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0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 2 7 1 0 3 4 9 0 4 2 4 6 13 2 27 26 12 1 4 1 4 4 4 8 7 7 6 4 0
12 19 18 13 9 13 16 4 12 5 3 19 29 14 15 43 48 31 152 146 102 83 58 44 45 16 27 14 12 24 34 19 14 8 10 8
16 25 46 20 37 37 40 39 26 0 11 18 25 5 11 11 37 724 1216 976 313 148 115 117 115 139 140 73 93 101 85 45 33 23 17 9
10 10 9 11 9 52 42 32 63 183 123 107 59 35 22 18 22 422 852 991 601 144 104 51 88 90 91 63 95 154 185 125 84 20 18 12
4 4 4 7 10 24 49 44 68 118 67 17 12 13 23 56 42 335 217 115 139 232 131 119 75 81 16 84 175 239 271 146 45 10 8 4
2 3 14 5 4 3 17 44 50 64 65 12 9 7 2 7 50 8 29 7 21 81 52 91 72 88 92 88 222 232 104 30 11 5 2 2
1 1 5 1 3 1 3 13 51 85 56 101 9 2 2 17 68 62 45 22 15 52 41 19 7 86 21 76 178 43 140 18 16 2 5 1
0 1 3 2 1 1 1 1 2 28 65 26 20 6 5 8 9 46 46 21 7 47 13 4 6 40 20 59 82 64 69 16 12 19 13 13
3 1 1 1 4 2 2 3 2 8 34 30 19 59 54 1 5 5 5 17 5 51 9 7 1 8 3 2 58 79 34 16 28 11 4 15
28 1 2 11 2 1 2 2 1 0 25 63 43 90 35 1 1 3 5 15 36 44 44 18 7 1 2 3 5 3 33 68 75 17 20 19
5 4 6 6 4 1 0 4 1 0 16 59 135 79 4 4 1 1 3 42 98 56 18 25 1 0 0 1 3 51 10 59 100 102 29 4
3 1 1 0 0 0 0 0 22 86 91 1 0 0 0 1 1 30 63 1 2 7 1 4 1 0 1 44 22 83 235 117 7 12
1 0 0 0 0 31 26 0 0 4 0 4 0 4 0 89 0 1 7
8 12 13 0 0 0 0 0 0 0 0 3
0 8 34 3 0 1 0 4 4 3 4 4 4
3 6 0 7 0 4 4
4

TABLE 2

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH: July 2002

Monitoring procedures

Period		:One calendar month.	
Data monitored		:Reports from each unique identifier for drifting buoys.	
Standard of comparison		:Background field from UKMO global model.	
Position		:Average latitude and longitude for period.	
Observation times		:00, 06, 12, 18 UTC	
Elements monitored		:Mean sea level pressure (hPa). :Wind speed (m s^{-1}). :Wind direction (degrees). :Sea surface temperature (degrees).	
Parameters monitored	:NOBS	:Number of observations received excluding duplicates.	
	:PGE	:Percentage of observations with gross errors.	
	:%REJ	: Percentage of observations flagged excluding those with gross errors	
	:SD	:SD of difference of observations from background values excluding those with gross errors.	
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. a positive bias indicates the wind observation is veered to the background.**	
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.	
GROSS ERROR LIMIT	:15 hPa	(pressure)	
	:25 m s^{-1}	(vector wind)	
	:10 degrees	(sea surface temperature)	
SELECTION CRITERIA :	NOBS	≥ 20 , and one or more of the following:	
	1.|bias|	≥ 4 hPa	(pressure),
		≥ 5 m s^{-1}	(wind speed),
		≥ 30 degrees	(direction).
		≥ 3 degrees	(sea surface temperature).
	2.SD	≥ 6 hPa	(pressure),
		≥ 80 degrees	(direction).
		≥ 5 degrees	(sea surface temperature).
	3.PGE	≥ 25.	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
15910	-59.5	-30.8	P	489	16	100	5.4	4.6	7.1
17903	-50.4	64.9	P	1561	3	89	3.9	6.9	7.9
21534	43.3	138.7	P	611	100	100			
23949	7.6	82.7	P	192	32	48	4.4	-0.8	4.5
25571	85.7	-177.2	P	157	56	83	2.9	4.7	5.6
41665	38.6	-57.4	P	681	1	100	1.4	11.0	11.0
61664	41.9	28.0	P	173	0	100	0.6	-5.6	5.7
63662	67.8	-26.5	P	26	42	92	1.7	-5.4	5.7
71566	-61.5	13.6	P	493	43	80	6.7	-1.8	7.0

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
WIND SPEED									
14537	-7.7	40.6	SPEED	27	0	100	4.4	10.8	11.6
23924	11.3	82.7	SPEED	219	5	100	1.8	12.1	12.2

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
WIND DIRECTION									
21535	25.8	152.4	DIRN.	270	0	0	16.1	-37.9	41.2
23924	11.3	82.7	DIRN.	209	5	0	15.2	83.8	85.2
41648	25.6	-68.1	DIRN.	372	0	0	14.4	33.2	36.2

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
SEA SURFACE TEMPERATURES									
31987	-35.2	-51.3	SST	130	0	100	0.3	4.1	4.1
33629	-41.9	18.1	SST	181	0	100	1.7	3.9	4.3
44504	47.1	-40.6	SST	370	100	100			
44621	61.2	-50.2	SST	665	0	100	2.5	3.5	4.3
44772	58.1	-37.9	SST	692	0	86	1.9	4.7	5.1
46972	19.6	-130.3	SST	217	0	100	0.4	3.4	3.4
51642	-5.6	-167.5	SST	49	43	96	2.6	-6.1	6.6
51650	-6.1	150.8	SST	161	40	42	0.7	-1.0	1.2
51733	-17.6	-173.0	SST	130	100	100			
55905	-54.8	-130.7	SST	738	0	100	0.9	3.1	3.2
61536	34.0	35.6	SST	113	0	100	0.9	5.1	5.2
61659	41.9	34.3	SST	207	20	100	6.1	-2.0	6.4

Figure 2. DRIFTER mean daily count. JULY 2002

Main hours only

Global average number of observations in 24 hours = 9981

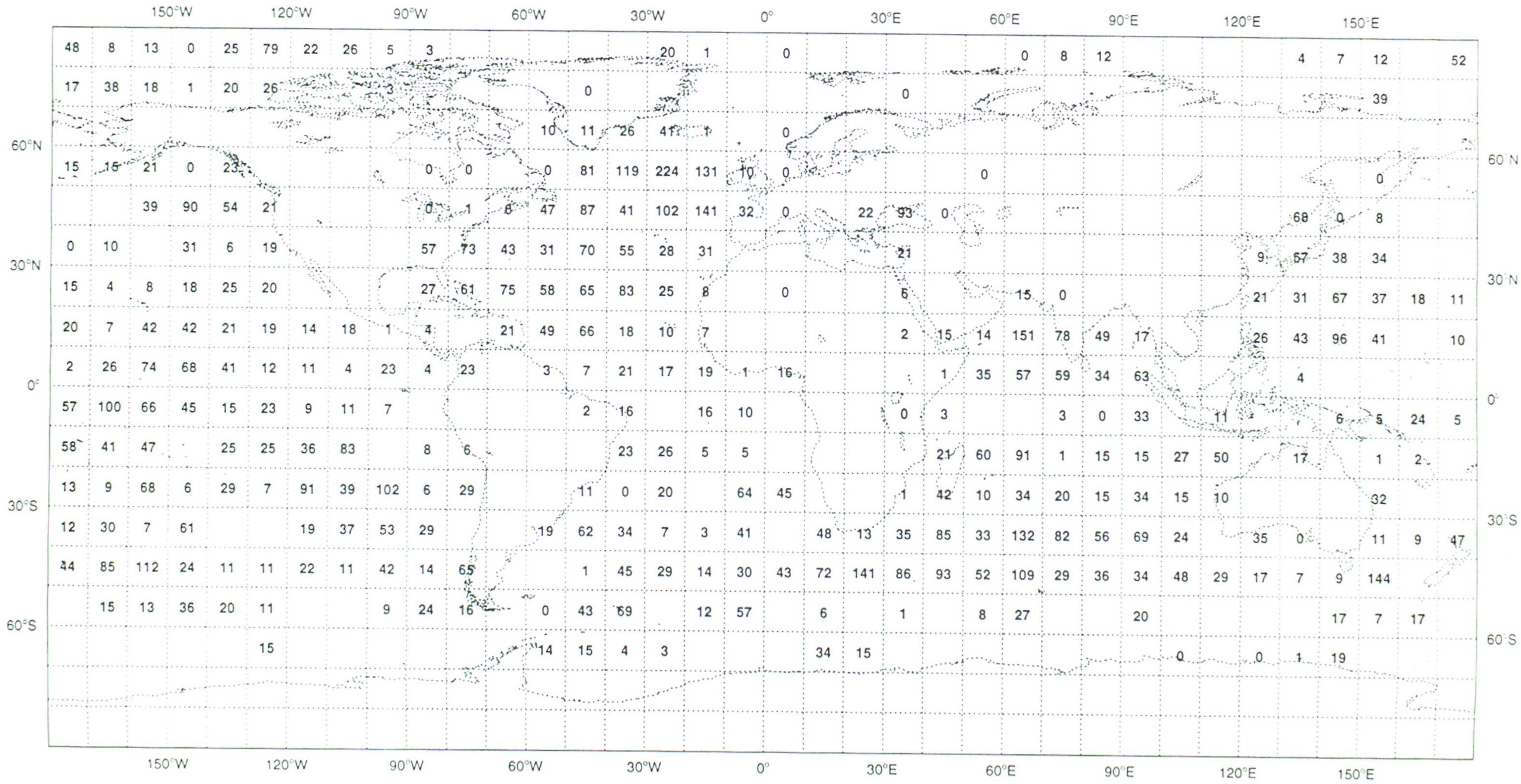

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
48 8 13 0 25 79 22 26 5 3 20 1 0 0 8 12 4 7 12 52
17 38 18 1 20 26 3 0 0 39
10 11 26 41 1 0
15 16 21 0 23 0 0 0 81 119 224 131 10 0 0 0
39 90 54 21 0 1 6 47 87 41 102 141 32 0 22 93 0 68 0 8
0 10 31 6 19 57 73 43 31 70 55 28 31 21 9 57 38 34
15 4 8 18 25 20 27 61 75 58 65 83 25 8 0 6 15 0 21 31 67 37 18 11
20 7 42 42 21 19 14 18 1 4 21 49 66 18 10 7 2 15 14 151 78 49 17 26 43 96 41 10
2 26 74 68 41 12 11 4 23 4 23 3 7 21 17 19 1 16 1 35 57 59 34 63 4
57 100 66 45 15 23 9 11 7 2 16 16 10 0 3 3 0 33 11 6 5 24 5
58 41 47 25 25 36 83 8 6 23 26 5 5 21 60 91 1 15 15 27 50 17 1 2
13 9 68 6 29 7 91 39 102 6 29 11 0 20 64 45 1 42 10 34 20 15 34 15 10 32
12 30 7 61 19 37 53 29 19 62 34 7 3 41 48 13 35 85 33 132 82 56 69 24 35 0 11 9 47
44 85 112 24 11 11 22 11 42 14 65 1 45 29 14 30 43 72 141 86 93 52 109 29 36 34 48 29 17 7 9 144
15 13 36 20 11 9 24 16 0 43 69 12 57 6 1 8 27 20 17 7 17
15 14 15 4 3 34 15 0 0 1 19

TABLE 3

MONITORING OF LAND SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
MONITORING CENTRE: BRACKNELL
MONTH: July 2002

Monitoring procedures		
Period		:One calendar month.
Data monitored		:Reports from each unique identifier for synops & autosynops.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00, 06, 12, 18 UTC
Elements monitored		:Surface pressure (hPa).
Parameters monitored	:HT(m)	:Station height (in metres) as given in WMO No. 9 Vol A
	:RP	:Pressure reporting practice M=mean sea level pressure (hPa) reported. S=Station level pressure reported. 8=Geopotential height (m) of 850 hPa surface reported. 7=Geopotential height (m) of 700 hPa surface reported.
	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:%REJ	:Percentage of observations flagged excluding those with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.
GROSS ERROR LIMIT	:15 hPa	(pressure)
SELECTION CRITERIA	:NOBS	≥ 20 ,and one or more of the following:
	1.|bias|	≥ 4 hPa
	2. SD	≥ 6 hPa
	3.PGE	≥ 25.

N.B. For stn ht ≥ 500m, mslp is that calculated from station level pressure where available.
For stn ht < 500m, mslp is that as reported by the station where available.

WMO REGION 1:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
60437	36.3N	2.8E	981	S8	52	0	0	0	0.7	-7.2	7.2
60476	35.4N	7.2E	1116	S8	48	25	52	4	0.6	14.2	14.2
60728	36.4N	10.7E	1	MS	61	0	0	0	0.8	-8.4	8.4
61492	16.1N	13.5W	18	MS	63	0	0	0	1.6	4.6	4.9
62790	12.1N	24.9E	674	MS	57	7	12	7	2.0	4.2	4.7
63330	13.5N	39.5E	2070	MS	37	37	100	43			
63333	11.1N	39.7E	1903	MS	39	0	0	0	0.9	5.2	5.3
63334	10.3N	37.7E	2515	MS	38	1	3	5	1.1	10.8	10.9
63402	7.7N	36.8E	1725	MS	39	0	0	0	0.9	8.4	8.4
63450	9.0N	38.8E	2354	MS	38	0	0	0	0.9	4.6	4.7
63471	9.6N	41.9E	1260	MS	39	0	0	0	0.8	8.8	8.8
63478	5.9N	43.6E	295	MS	27	0	0	0	0.6	5.0	5.0
63680	0.3N	32.6E	1144	S	29	1	3	0	1.0	-7.0	7.1
63801	4.9S	29.6E	882	S8	103	2	2	0	0.7	7.4	7.4
65355	9.8N	1.1E	342	MS	103	0	0	0	0.9	-12.6	12.6
67308	22.1S	31.7E	452	M	43	43	100	0			
68030	18.5S	25.6E	1071	8	85	0	0	2	1.0	4.5	4.6
68038	20.5S	26.0E	903	8	84	0	0	2	1.2	4.0	4.2
68338	26.9S	24.6E	1234	S8	62	62	100	0			
68396	26.5S	31.3E	641	S8	60	0	0	2	1.0	4.7	4.8
68558	30.9S	27.6E	1816	S8	36	36	100	0			
68575	30.0S	30.0E	1175	S8	119	119	100	0			
68754	32.5S	27.5E	899	S8	79	79	100	0			

WMO REGION 2:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
23975	60.4N	88.4E	86	7	121	120	99	0	0.0	-2.4	2.4
30554	54.5N	113.6E	995	MS	122	0	0	0	4.7	4.8	6.7
30967	49.9N	115.8E	623	MS	91	0	0	0	1.3	-5.4	5.6
36982	41.9N	78.2E	3635	S7	113	1	1	6	1.4	4.2	4.4
40713	37.4N	46.3E	1475	MS	114	18	16	0	0.5	14.1	14.1
40726	36.8N	45.7E	1384	MS	115	0	0	0	0.7	4.5	4.6
40741	36.6N	61.2E	235	MS	110	1	1	0	0.9	-4.3	4.4
41254	23.1N	57.7E	1755	S8	70	70	100	0			
43415	8.8N	80.5E	98	S	29	28	97	0	0.0	9.8	9.8
44416	28.6N	81.6E	720	MS	67	0	0	0	1.2	4.1	4.3
47022	40.8N	128.2E	1200	S	77	0	0	1	1.4	4.7	4.9
47127	36.9N	127.0E	16	MS	124	0	0	0	0.9	-11.3	11.3
48924	21.1N	101.5E	644	S	24	0	0	100	1.4	9.8	9.9
48925	20.7N	102.0E	550	M	38	8	21	97	0.7	-13.8	13.8
48935	19.5N	103.1E	1050	8	48	1	2	42	1.7	-6.6	6.8
51495	43.5N	91.6E	874	M	122	0	0	0	1.1	6.3	6.4
52602	38.8N	93.4E	2734	S	124	0	0	0	1.2	-7.1	7.2
52955	35.6N	100.8E	3201	S	124	0	0	0	0.9	11.7	11.7
56146	31.6N	100.0E	339	S	124	124	100	0			
56444	28.5N	98.9E	3488	S	124	63	51	21	0.6	13.3	13.3
56462	29.0N	101.5E	2994	S	124	0	0	0	1.2	8.7	8.8

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
80099	7.1N	70.7W	128	MS	40	0	0	0	1.0	-6.1	6.2
82181	2.0S	54.1W	146	MS	55	0	0	0	0.6	4.9	4.9
83235	12.4S	46.4W	604	MS	87	0	0	1	1.0	6.4	6.5
83332	14.1S	46.4W	826	MS	84	31	37	0	0.7	14.2	14.2
83531	18.6S	46.5W	940	MS	85	0	0	0	0.6	-7.5	7.5

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
83836	25.5S	50.6W	837	MS	87	0	0	0	0.7	-5.5	5.5
84377	3.8S	73.3W	125	MS	99	0	0	0	1.0	5.0	5.1
84401	5.2S	80.6W	49	MS	101	0	0	0	0.8	4.1	4.2
84425	5.9S	76.1W	179	MS	68	0	0	1	1.6	5.0	5.2
84455	6.5S	76.4W	281	MS	72	0	0	0	1.1	8.4	8.5
84472	7.1S	78.5W	2620	S	50	0	0	0	0.9	-5.4	5.5
84474	7.2S	76.7W	350	S	22	0	0	0	1.1	10.8	10.9
84686	13.6S	72.0W	3248	S	101	0	0	0	0.8	-4.1	4.2
84688	13.7S	73.4W	3444	S	48	0	0	0	0.5	-12.7	12.7
84720	14.9S	75.0W	567	MS	52	0	0	0	1.3	5.6	5.7
84782	18.1S	70.3W	468	MS	83	0	0	1	2.1	7.5	7.8
85264	18.5S	64.1W	1998	S	61	61	100	0			
85312	19.8S	63.9W	992	S	46	3	7	0	1.6	-10.8	10.9
85406	18.3S	70.3W	55	M	123	1	1	0	1.3	4.1	4.3
85432	22.5S	68.9W	2320	S8	83	0	0	0	0.9	5.0	5.1

WMO REGION 4:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
71023	65.9N	89.5W	18	S	123	123	100	0			
71599	44.4N	65.2W	127	MS	123	0	0	0	0.6	-4.0	4.0
71747	48.8N	91.6W	424	MS	122	0	0	0	0.6	4.1	4.1
72327	36.1N	86.7W	182	MS	122	0	0	0	0.6	4.6	4.6
76243	28.7N	100.5W	250	MS	81	0	0	0	1.1	6.3	6.4
76543	22.0N	98.8W	104	MS	35	0	0	3	0.9	7.2	7.3
76625	20.6N	100.4W	1813	MS	31	0	0	0	0.6	-9.6	9.6
76640	20.9N	97.4W	28	MS	106	0	0	1	1.0	4.7	4.8
76658	19.2N	103.7W	494	MS	25	0	0	0	0.7	5.8	5.8
76683	19.3N	98.2W	2248	MS	73	0	0	0	0.6	4.1	4.1
76743	18.0N	92.9W	10	MS	62	0	0	2	1.3	6.7	6.8
76762	17.5N	99.5W	1265	MS	68	0	0	37	1.1	5.1	5.2
76903	14.9N	92.3W	118	MS	84	0	0	0	0.8	6.8	6.8

WMO REGION 5:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
92010	6.1S	145.4E	1587	M	50	1	2	0	0.9	10.0	10.0
94130	14.8S	131.9E	120	MS	51	0	0	100	0.7	5.1	5.1
94322	20.2S	130.0E	340	MS	123	123	100	0			
94368	20.3S	149.0E	2	MS	121	0	0	0	0.5	-4.6	4.6
95815	35.1S	144.0E	72	MS	124	0	0	0	2.7	4.1	4.9
96505	3.7N	115.7E	914	S8	35	34	97	0	0.0	-1.9	1.9
97378	10.7S	123.1E	1	MS	53	51	96	0	0.1	-14.7	14.7

WMO REGION 6:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
06685	47.0N	9.1E	515	MS	123	0	0	0	1.0	6.3	6.4
10557	50.5N	11.1E	845	S8	372	372	100	0			
12140	54.4N	18.7E	2	MS	123	0	0	0	0.6	7.8	7.8
13269	44.3N	19.9E	176	MS	122	0	0	0	0.8	7.7	7.7
14554	44.9N	18.4E	140	S	62	0	0	0	1.2	-12.8	12.9
15140	46.5N	22.4E	500	S	24	24	100	0			
16470	36.8N	12.0E	191	MS	117	0	0	0	0.6	-4.1	4.1
17092	39.8N	39.5E	1218	S8	124	0	0	0	1.2	6.6	6.7
17203	38.9N	40.5E	1177	S8	91	0	0	12	2.1	6.5	6.8
40296	31.0N	35.5E	-350	M	94	2	2	13	1.9	5.2	5.5

ANTARCTIC:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
89004	71.7S	2.8W	815	M	102	0	0	0	1.5	-7.7	7.8
89208	90.0S	0.0W	2835	M	32	32	100	0			
89263	66.0S	66.1W	20	M	252	5	2	0	2.4	10.5	10.8
89264	71.4S	68.9W	780	S	262	0	0	0	1.7	8.2	8.4
89266	72.2S	60.3W	91	S	256	89	35	0	1.5	-12.4	12.5
89272	74.8S	71.5W	1369	S	263	263	100	0			
89512	70.8S	11.8E	140	MS	123	2	2	2	1.8	-5.0	5.3
89744	74.0S	43.0E	3353	S	281	0	0	0	0.8	7.7	7.7
89769	78.5S	168.4E	50	S	398	398	100	0			
89847	67.6S	146.0E	30	S	33	0	0	0	2.1	-9.3	9.5

TABLE 4A

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: July 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :300.0 - 150.0 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP $\geq$ 20

NB: All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAH	2637	0	38	1.1	0.3	2617	0	38	0	5.0	0.9
AAL	7158	0	32	1.4	0.2	6913	0	33	0	5.8	0.6
AAR	1505	1	6	1.5	-0.2	1499	0	7	0	7.1	0.6
ACA	3919	0	8	1.6	0.0	3460	0	9	0	6.9	0.4
AEA	994	0	3	1.6	0.5	547	0	2	0	5.9	1.1
AEL	419	0	10	1.6	-0.6	330	0	12	0	5.8	0.1
AFL	607	2	7	2.3	0.6	455	0	5	0	7.0	1.1
AFR	1836	1	8	1.5	0.3	1429	0	9	0	6.9	0.7
AIS	178	1	8	1.3	-0.3	177	0	10	0	7.0	0.4
AJM	490	1	2	1.2	-0.1	414	0	4	0	7.4	1.1
AJX	258	0	5	1.3	0.7	249	0	7	0	7.8	1.1
AMM	142	0	9	1.7	0.5	103	0	10	0	7.5	0.6
AMT	1867	0	43	1.0	0.0	1866	0	44	0	4.9	0.5
AMX	347	1	5	1.7	0.3	253	0	6	0	8.3	0.5
ANA	356	1	3	1.2	0.5	349	0	4	0	7.5	0.9
ANZ	3518	0	26	1.4	0.3	3497	0	26	0	6.8	0.5
ARG	26	4	15	3.6	-1.0	20	0	10	0	13.6	3.3
AVA	268	0	2	1.8	0.9	170	0	5	0	7.6	1.2
AVE	113	4	9	1.9	0.9	71	0	8	0	7.7	2.4
AVN	151	0	46	1.1	0.3	152	1	47	0	5.1	0.8
AXF	22	0	14	1.3	-0.6	22	0	14	0	6.1	2.4
AZA	690	1	8	1.9	0.1	567	0	5	0	6.8	0.6
BAF	21	0	0	1.6	-1.1	21	0	0	0	5.2	0.9
BAL	182	0	8	1.5	0.3	159	0	9	0	6.5	0.8
BAW	906	1	6	1.6	-0.3	845	0	6	0	6.5	0.7
BSK	53	0	15	2.0	0.4	53	0	23	0	12.2	2.3
BWA	309	1	6	1.4	0.5	209	0	9	0	6.5	1.1
CAL	101	0	5	1.3	0.2	108	0	8	0	7.6	0.3
CCA	268	3	14	1.9	0.7	304	0	100	0	10.1	0.0
CES	382	1	7	1.5	0.6	386	0	10	0	8.1	-0.1
CFC	21	0	10	1.5	0.2	20	0	15	0	6.3	-1.1
CFG	763	1	4	1.5	-0.6	596	0	5	0	6.4	0.3
CGA	33	0	0	0.9	-0.1	32	0	0	0	3.5	0.8
CGF	23	0	4	1.1	-0.3	22	0	5	0	3.8	1.1
CGH	91	0	0	1.2	0.1	87	0	3	0	6.2	0.6
CKS	258	0	74	2.6	2.3	250	0	42	0	4.8	1.1
CLX	438	1	6	1.7	-0.2	350	0	7	0	7.0	-0.1
CMI	112	1	13	1.3	0.2	110	0	14	0	6.9	0.3
COA	1175	1	41	1.1	-0.1	1103	0	43	0	5.2	0.6
CRL	952	1	7	1.3	0.4	705	0	13	0	10.2	1.4
CSN	96	1	13	2.1	-0.1	96	2	20	0	11.6	1.4
CTM	31	0	10	2.3	-0.8	28	0	11	0	8.1	0.0
CUB	367	1	6	1.7	0.6	289	0	6	0	7.7	1.1
DAB	79	0	5	1.2	-0.1	77	0	5	0	3.9	1.3
DAI	104	0	0	1.0	0.2	98	0	0	0	3.9	0.7
DAL	3034	1	41	1.2	0.0	2899	0	42	0	5.6	0.3
DBR	43	0	7	1.6	-0.7	45	0	7	0	6.2	-0.3
DCE	260	0	8	1.1	0.2	225	0	8	0	5.6	-0.1
DLH	1483	1	11	1.7	0.0	1295	0	12	0	6.7	0.7
EDW	92	1	7	1.6	0.1	78	0	4	0	6.3	1.6
EIA	295	0	14	1.8	0.2	287	0	100	0	16.6	3.6
ELY	211	0	2	1.6	0.0	210	0	2	0	6.8	0.6
ETH	56	0	9	0.8	0.1	58	0	12	0	7.7	0.4
EVA	113	1	12	1.2	0.1	123	0	12	0	6.9	0.1
EWW	128	0	6	1.7	0.2	121	1	10	0	9.6	0.0
FDX	2115	0	42	1.4	0.4	2101	0	42	0	7.1	0.6
FGS	60	0	0	1.3	0.3	59	0	0	0	3.6	0.8
FGZ	24	0	0	1.3	0.2	23	0	0	0	5.0	1.4
FIN	373	0	2	1.6	0.3	343	0	3	0	6.3	0.7

		TEMPERATURE					WIND				
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
FJI	752	1	47	1.4	0.5	720	1	64	0	8.7	0.4
FOM	344	1	10	1.3	-0.1	342	0	9	0	5.3	0.8
GAF	38	0	3	2.0	-1.0	39	0	0	0	5.1	1.5
GCO	370	2	19	1.6	0.2	360	0	100	0	13.7	2.1
GHA	102	0	0	1.4	-0.2	81	0	4	0	9.7	3.5
GRL	55	0	2	1.9	0.1	40	0	0	0	5.0	1.0
GTI	326	0	11	1.7	0.0	334	0	12	0	7.3	0.9
GWW	48	0	2	1.0	0.0	44	0	2	0	4.0	-0.3
HAL	5573	0	39	1.2	0.0	5493	0	39	0	6.7	1.0
IBE	3251	1	5	1.5	0.6	2059	0	7	0	6.6	1.0
ICE	968	0	3	1.6	0.0	901	0	4	0	7.5	0.9
IWD	276	0	2	1.5	-0.1	174	0	3	0	6.6	1.0
JAA	167	1	9	2.4	1.8	167	0	7	0	7.2	1.7
JAL	2725	0	4	1.7	0.8	2672	0	5	0	7.5	0.3
JAZ	1084	1	6	1.8	1.3	1059	0	5	0	7.1	0.4
JBU	69	4	6	0.7	0.1	71	0	4	0	5.3	0.6
JMC	134	1	7	1.5	0.4	119	0	9	0	7.9	1.1
KAL	3414	0	9	1.5	0.0	3400	0	10	0	7.3	0.4
KIW	29	7	62	2.9	2.7	29	0	59	0	3.4	-0.9
KLM	2046	0	3	1.4	0.3	1599	0	4	0	6.1	0.9
LAN	392	1	5	1.7	-0.4	387	0	56	0	6.0	0.7
LAP	48	2	23	2.6	0.3	45	0	18	0	11.4	0.4
LDA	45	0	9	1.2	0.1	40	0	10	0	5.7	0.7
LDI	533	0	5	1.4	-0.6	386	0	7	0	7.1	0.3
LIB	1024	1	7	1.7	0.9	727	0	5	0	6.9	1.2
LOT	131	0	3	1.8	-1.0	111	0	4	0	5.3	0.9
LTU	791	1	5	1.5	0.2	632	0	6	0	7.1	1.1
LXJ	20	0	40	0.7	0.1	20	0	45	0	9.0	3.6
LXR	122	2	7	1.7	0.4	72	0	14	0	9.7	1.0
MAS	267	0	6	1.5	0.4	271	0	6	0	7.6	0.2
MON	78	0	3	1.7	0.2	50	0	4	0	7.2	1.0
MPD	531	1	4	1.6	0.0	350	0	4	0	6.5	0.9
MPH	742	0	4	1.6	-0.6	632	0	5	0	7.2	0.6
MYT	409	0	4	1.5	0.0	342	0	4	0	7.3	0.8
NCA	876	0	4	1.9	0.4	671	0	6	0	6.9	0.0
NGA	63	0	2	1.2	0.7	44	0	2	0	4.6	0.6
NWA	9908	0	10	1.7	0.5	9711	0	10	0	7.5	0.4
NZL	3659	0	16	1.4	0.1	3659	0	16	0	5.7	0.8
OAE	171	0	42	1.7	-0.2	167	0	40	0	6.3	1.2
PAC	467	1	25	1.6	0.4	477	0	24	0	5.5	0.5
PAL	1400	0	9	1.4	0.1	1313	0	11	0	7.7	0.5
PAO	372	1	55	1.6	0.3	369	1	56	0	9.9	0.6
PUA	25	0	20	2.8	0.4	20	0	30	0	19.3	5.1
QFA	2094	0	42	1.4	0.5	2077	0	42	0	5.9	0.2
RAF	50	0	4	2.4	1.1	50	0	2	0	7.7	0.7
RAM	362	1	3	1.5	0.3	188	0	4	0	8.1	1.1
RCH	289	1	100	3.0	-0.3	275	0	100	0	10.9	2.1
RJA	62	0	2	1.6	-0.1	62	0	10	0	11.1	1.2
RRR	136	1	10	2.0	0.1	117	0	7	0	6.3	0.9
RYN	558	0	42	0.9	0.3	558	0	43	0	4.7	0.3
RZO	574	1	5	2.7	1.2	284	0	4	0	7.0	0.7
SAA	307	1	4	1.4	-0.3	248	0	3	0	6.5	1.2
SIA	240	0	2	1.3	0.4	243	0	3	0	6.9	0.7
SLR	232	0	9	1.3	0.1	206	0	9	0	6.7	0.0
SQC	62	0	3	1.4	0.7	62	0	3	0	4.9	0.1
SSV	69	0	1	1.8	-0.3	72	0	6	0	8.5	0.0
SVA	68	1	9	1.7	0.8	69	1	10	0	6.1	1.3
TAG	41	0	22	1.8	0.0	42	0	50	0	7.1	1.2
TAM	69	3	13	2.8	0.6	70	0	11	0	10.4	2.0

		TEMPERATURE				WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
TAP	950	0	3	1.4	-0.1	352	0	6	0	8.0	0.7
TCV	28	0	0	1.8	1.3	23	0	0	0	6.0	0.7
THA	155	0	5	1.4	-0.2	158	0	5	0	6.9	0.9
THT	186	5	34	1.6	0.6	182	0	32	0	8.3	-0.1
TPA	53	0	6	0.9	0.5	51	0	6	0	6.9	0.7
TSC	187	2	3	1.4	0.4	150	0	5	0	7.5	1.5
UAL	254952	0	97	0.9	0.0	258766	0	96	0	4.7	0.6
UPS	2014	0	52	1.8	0.5	1990	0	51	0	7.4	0.7
USA	127	2	4	1.1	0.2	100	0	4	0	7.9	0.6
VIR	311	0	3	1.4	0.1	292	0	4	0	7.7	1.0
VRG	186	2	53	2.3	0.8	181	1	100	0	11.0	1.9
VVJ	21	5	38	2.0	0.1	26	0	38	0	10.3	-1.4
VVR	55	4	31	2.8	-0.1	54	0	26	0	7.3	2.1
WOA	317	1	10	1.9	0.5	291	0	10	0	7.9	-0.1
YSS	189	6	22	3.4	1.8	136	0	7	0	6.4	1.0
9VS	60	0	0	1.1	-0.2	58	0	0	0	4.2	0.9

		TEMPERATURE				WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AR	1412	1	100	3.5	3.3	1397	0	4	0	6.1	1.2
AU	35171	0	11	1.3	0.6	35176	0	11	0	5.4	0.4
EU	134626	0	26	1.3	0.3	134625	0	26	0	4.9	0.5
KL	2828	0	7	1.6	1.0	2807	0	7	0	7.1	0.5
LH	2864	0	13	1.6	1.2	2854	0	13	0	5.1	0.7
LN	24	0	50	3.3	1.5	24	0	38	0	7.8	3.6
MK	2809	0	7	1.8	1.3	2798	0	8	0	8.2	0.4
SA	4831	0	52	1.9	1.2	4826	0	8	0	7.9	0.6
TN	36	0	17	2.0	1.3	40	0	20	0	7.5	0.3
N	1609	0	18	1.7	0.3	1586	0	18	0	6.4	0.9
US ACARS	1053209	1	61	1.2	0.5	1053206	0	61	0	5.1	0.8

TABLE 4B

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: July 2002

Monitoring procedures

Period		:One calendar month.
Data monitored		:Statistics for each airline carrier.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:All hours combined.
Level(s) monitored		:1000.0 – 300.1 hPa
Elements monitored		:TEMP in °C ; WIND in m s^{-1}
Parameters monitored		
	:N REP.	:Number of observations received excluding duplicates.
	:PG	:Percentage of observations with gross errors.
	:PR	:Percentage of observations rejected by quality control including rejections from the duplicate check.
	:PC	:Percentage of observations with calm winds.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.
GROSS ERROR LIMITS		:10.0 °C ; 60 m s^{-1} Vector Wind
SELECTION CRITERIA		:N REP ≥ 20

NB: All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAL	113	2	24	0.8	0.3	108	0	23	0	6.2	1.4
ACA	41	0	17	1.2	0.5	41	0	20	0	6.9	-0.4
AFR	119	0	8	1.9	0.1	106	0	5	0	4.9	0.8
AME	51	31	41	3.7	1.6	47	0	4	0	5.5	1.5
ANZ	158	1	23	1.2	0.3	160	0	23	0	6.5	0.6
ATN	27	0	0	1.8	1.3	26	0	8	0	11.4	-0.1
AVN	20	5	50	2.7	-0.9	20	0	50	0	9.0	1.4
AXF	24	0	17	1.4	0.5	24	0	21	0	9.5	0.6
AZA	65	3	9	1.0	0.0	56	0	11	0	6.1	1.1
BAF	26	0	4	1.6	-0.2	26	0	0	0	4.4	0.1
CFC	137	0	9	1.6	0.7	133	0	10	0	5.2	0.1
CFG	46	0	7	1.7	-1.1	34	0	6	0	6.1	-0.2
CLX	31	3	6	1.7	0.0	29	0	7	0	6.8	-0.3
CMI	33	0	24	1.4	-0.2	30	0	27	0	4.3	0.5
COA	57	0	46	1.7	-0.1	53	0	45	0	5.4	-0.8
CRL	26	0	12	1.1	0.7	24	0	21	0	14.0	7.8
CUB	35	6	9	1.1	0.9	23	0	9	0	12.1	-0.7
DAL	233	1	57	1.3	0.2	238	0	57	0	4.9	0.9
DLH	117	0	12	1.4	0.2	116	0	15	0	5.7	0.6
EWW	45	0	0	1.4	0.9	43	0	5	0	7.6	-0.1
FDX	322	0	34	1.3	0.6	325	0	35	0	6.7	1.0
FIN	36	8	11	1.3	1.0	30	0	0	0	5.8	0.7
FXI	41	2	10	2.5	0.6	35	0	9	0	10.1	1.7
GAF	44	5	5	1.2	0.6	38	0	0	0	5.0	1.0
GCO	189	0	7	1.4	-0.1	185	1	100	0	15.5	3.3
GTI	59	0	2	1.1	-0.1	61	0	5	0	7.9	0.4
HAL	68	3	49	2.2	0.3	70	0	46	0	7.0	1.4
IBE	34	6	18	1.6	1.2	22	0	18	0	8.0	0.2
ICE	46	0	0	0.9	-0.2	44	0	5	0	9.6	2.3
JAL	34	0	3	1.8	0.5	31	0	3	0	7.4	0.0
JAZ	93	1	5	1.5	0.9	93	0	5	0	8.5	-0.6
KAL	51	2	12	1.7	-0.6	51	0	8	0	3.9	-0.8
KIW	59	2	44	3.8	2.3	57	0	33	0	6.7	-0.1
KLM	53	2	8	1.9	0.1	40	0	3	0	4.7	0.4
LIB	44	5	9	1.4	0.8	27	0	0	0	5.2	0.4
LOB	23	0	96	2.9	-2.7	20	0	75	0	22.1	9.4
MAS	34	0	29	2.4	0.6	34	0	29	0	8.0	1.5
MPH	56	2	9	2.3	-0.3	51	0	4	0	5.9	0.4
NCA	116	0	1	1.8	0.8	94	0	1	0	6.4	-0.7
NWA	403	0	9	1.7	0.5	395	0	9	0	7.6	-0.4
NZL	25229	0	61	1.3	0.5	25229	0	62	0	5.0	0.2
PAC	22	5	23	1.3	0.4	23	0	26	0	8.8	1.6
PAL	25	0	16	1.4	-0.6	21	0	24	0	7.3	0.9
QFA	132	0	55	1.7	0.1	132	0	55	0	6.3	0.0
RCH	131	7	100	3.7	-1.4	116	1	100	0	13.8	4.6
RRR	193	1	15	2.6	1.1	186	0	12	0	8.6	0.1
SAA	45	0	2	1.7	-0.7	44	0	5	0	4.5	1.1
SIA	38	0	5	1.1	0.0	38	0	5	0	4.7	0.9
UAL	555361	0	99	1.1	0.0	554644	0	99	0	3.8	0.5
UPS	119	1	47	1.7	0.0	113	0	47	0	6.8	1.3
VTA	21	10	29	1.8	-1.2	24	0	21	0	4.1	0.6
WOA	33	0	3	1.0	0.6	34	0	18	0	9.6	1.8
AR	831	0	100	2.4	1.9	826	0	48	0	4.6	0.6
AU	20936	0	47	1.2	0.5	20942	0	47	0	4.4	0.2
EU	538081	0	67	1.1	0.2	535649	0	67	0	3.8	0.1

		TEMPERATURE					WIND				
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
KL	1857	0	60	1.6	0.4	1849	0	60	0	4.0	0.6
LH	1344	0	62	1.3	0.4	1335	0	62	0	4.3	0.8
MK	2197	0	53	1.5	0.5	2183	0	53	0	4.8	0.6
SA	3534	0	71	1.7	0.6	3532	0	57	0	4.8	0.7
N	37	3	38	1.8	0.6	37	0	43	0	10.2	1.7
US ACARS	1959922	0	78	1.2	0.2	1954555	0	78	0	3.8	0.4

Figure 3a. AIRCRAFT 300 - 150 hPa mean daily count. JULY 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 51182

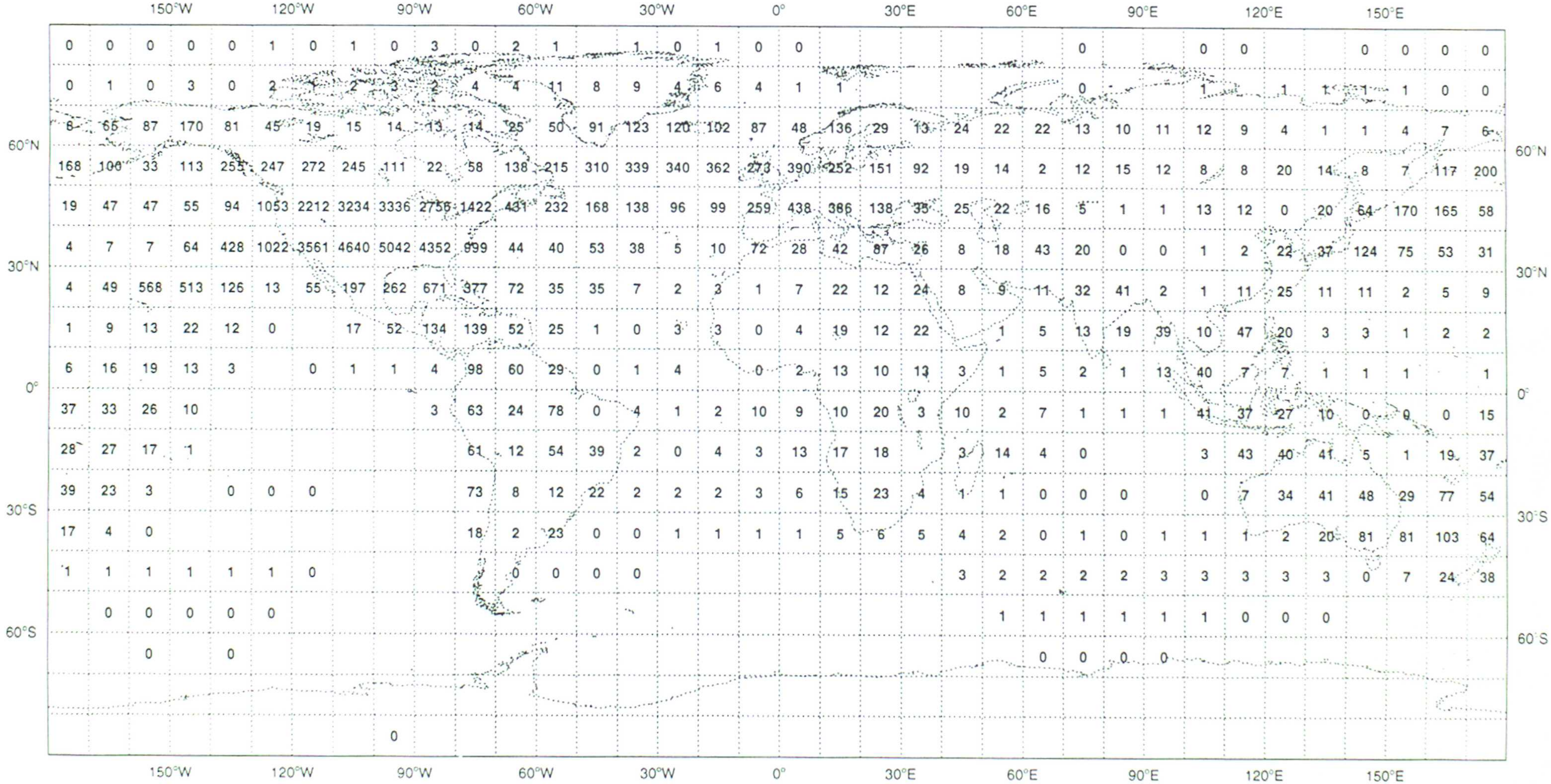

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 3b. AIRCRAFT 1000 - 301 hPa mean daily count. JULY 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 100156

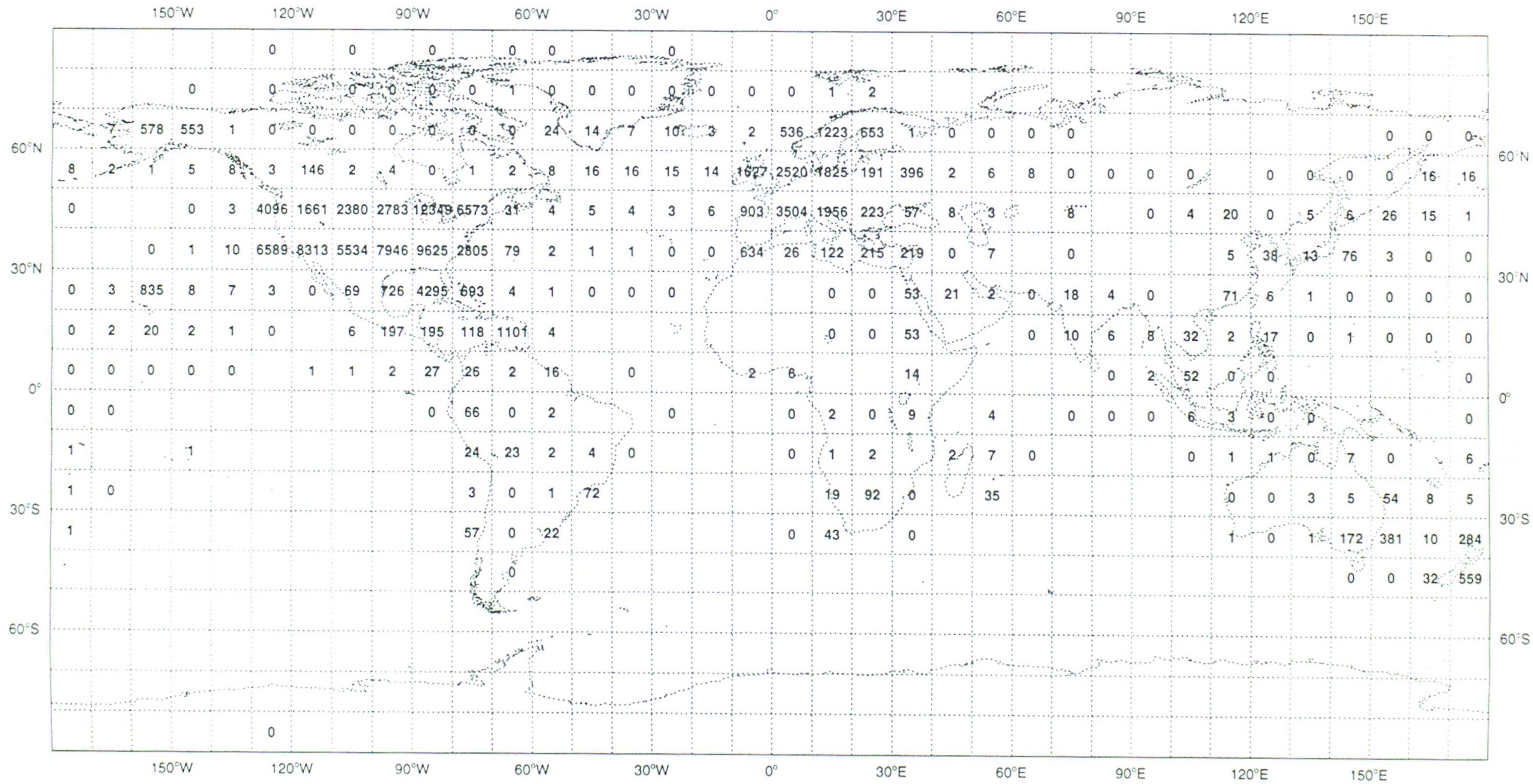

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
0 0 0 0 0 0
0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 2
7 578 553 1 0 0 0 0 0 0 0 24 14 7 10 3 2 536 1223 653 1 0 0 0 0 0 0 0
8 2 1 5 8 3 146 2 4 0 1 2 8 16 16 15 14 1627 2520 1825 191 396 2 6 8 0 0 0 0 0 0 0 0 16 16
0 0 3 4096 1661 2380 2783 12349 6573 31 4 5 4 3 6 903 3504 1956 223 57 8 3 8 0 4 20 0 5 6 26 15 1
0 1 10 6589 8313 5534 7946 9625 2805 79 2 1 1 0 0 634 26 122 215 219 0 7 0 5 38 13 76 3 0 0
0 3 835 8 7 3 0 69 726 4295 693 4 1 0 0 0 0 0 53 21 2 0 18 4 0 71 6 1 0 0 0 0
0 2 20 2 1 0 6 197 195 118 1101 4 0 0 53 0 10 6 8 32 2 17 0 1 0 0 0
0 0 0 0 0 1 1 2 27 26 2 16 0 2 6 14 0 2 52 0 0 0
0 0 0 66 0 2 0 0 2 0 9 4 0 0 0 6 3 0 0 0
1 1 24 23 2 4 0 0 1 2 2 7 0 0 1 1 0 7 0 6
1 0 3 0 1 72 19 92 0 35 0 0 3 5 54 8 5
1 57 0 22 0 43 0 1 0 1 172 381 10 284
0 0 0 32 559
0

Figure 4a. AIRCRAFT 300 - 150 hPa mean winds. JULY 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

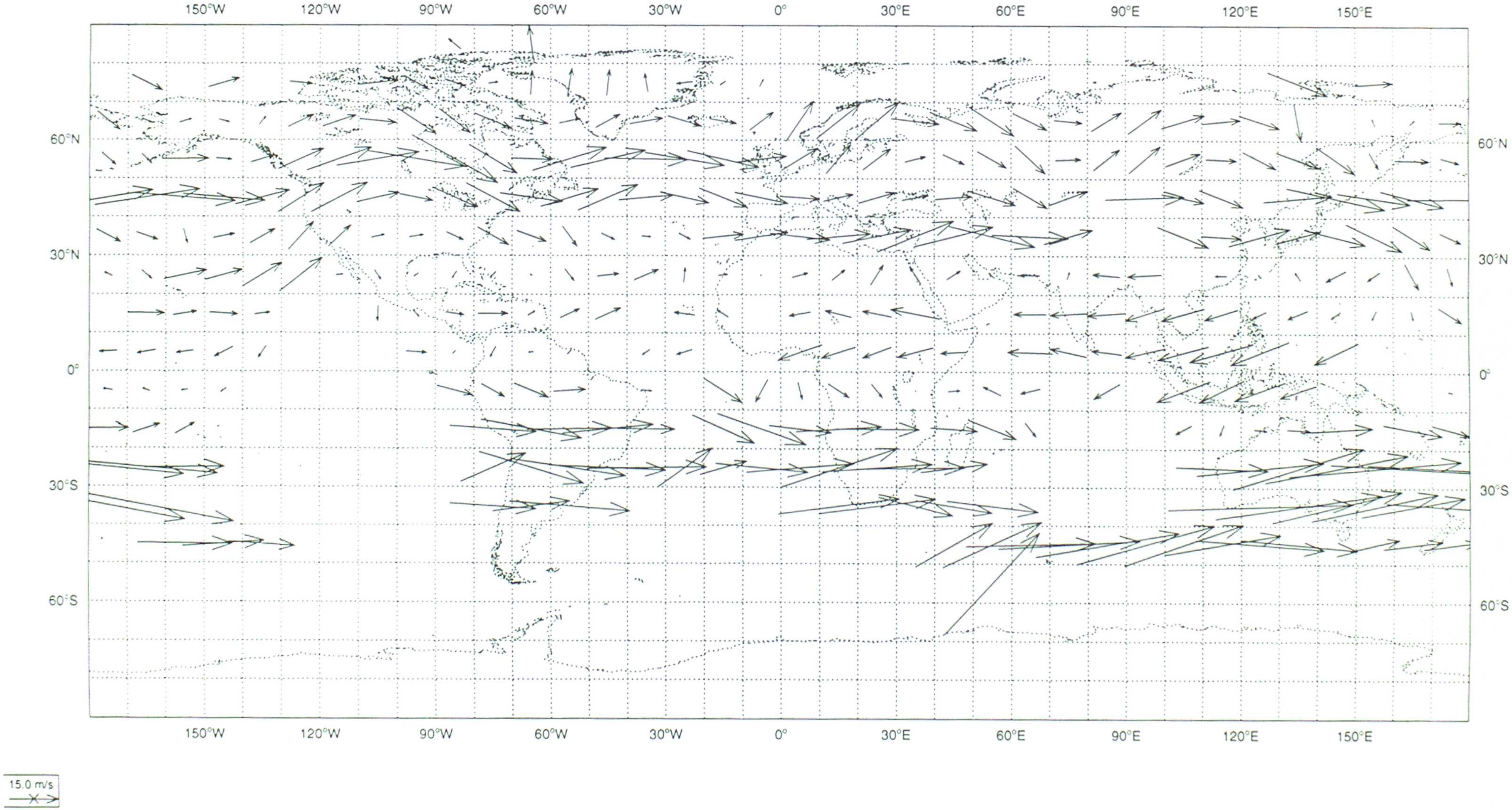

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0 m/s

Figure 4b. AIRCRAFT 1000 - 301 hPa mean winds. JULY 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

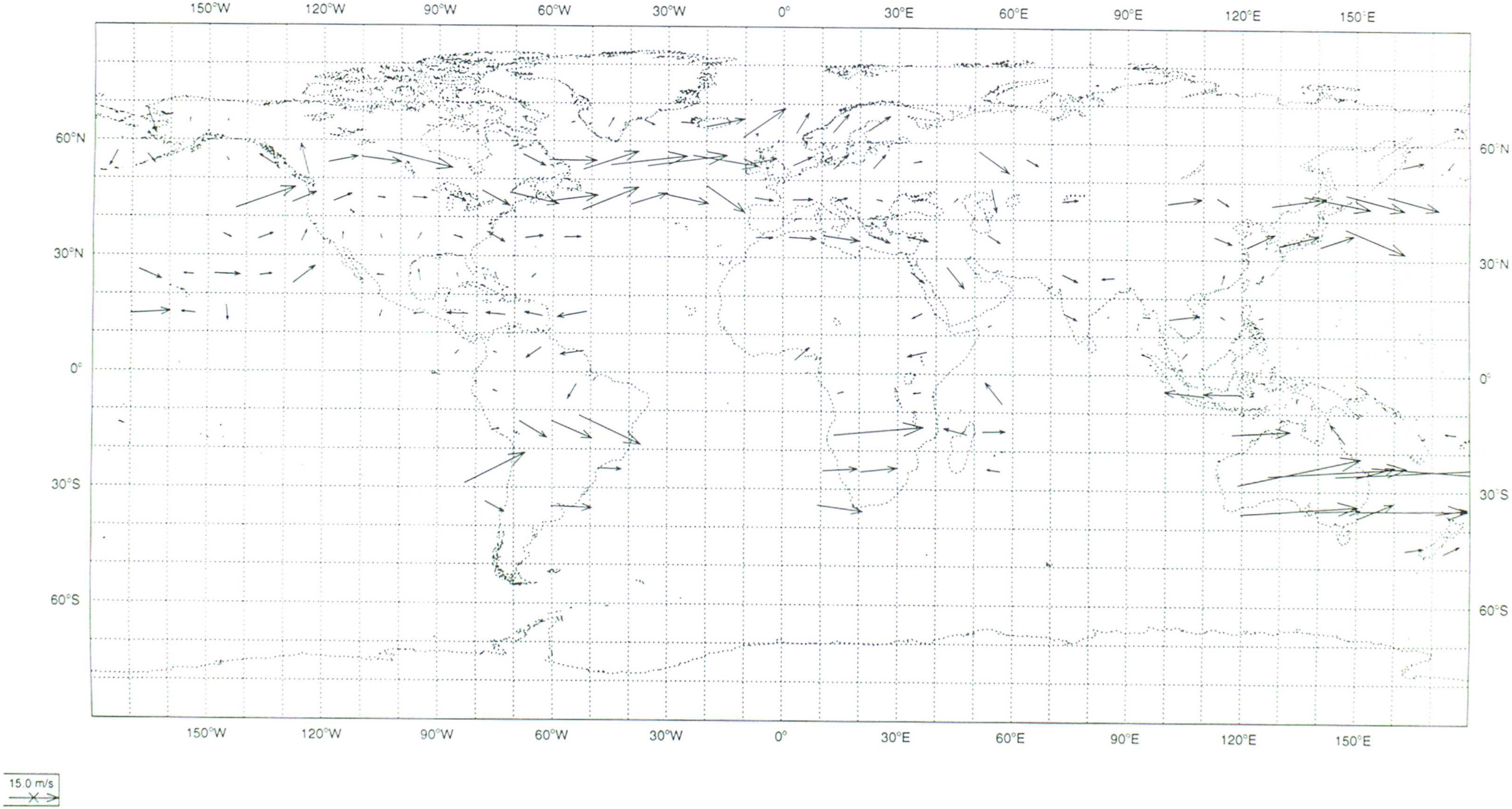

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0 m/s

Figure 5a. AIRCRAFT 300 - 150 hPa mean O-B winds. JULY 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

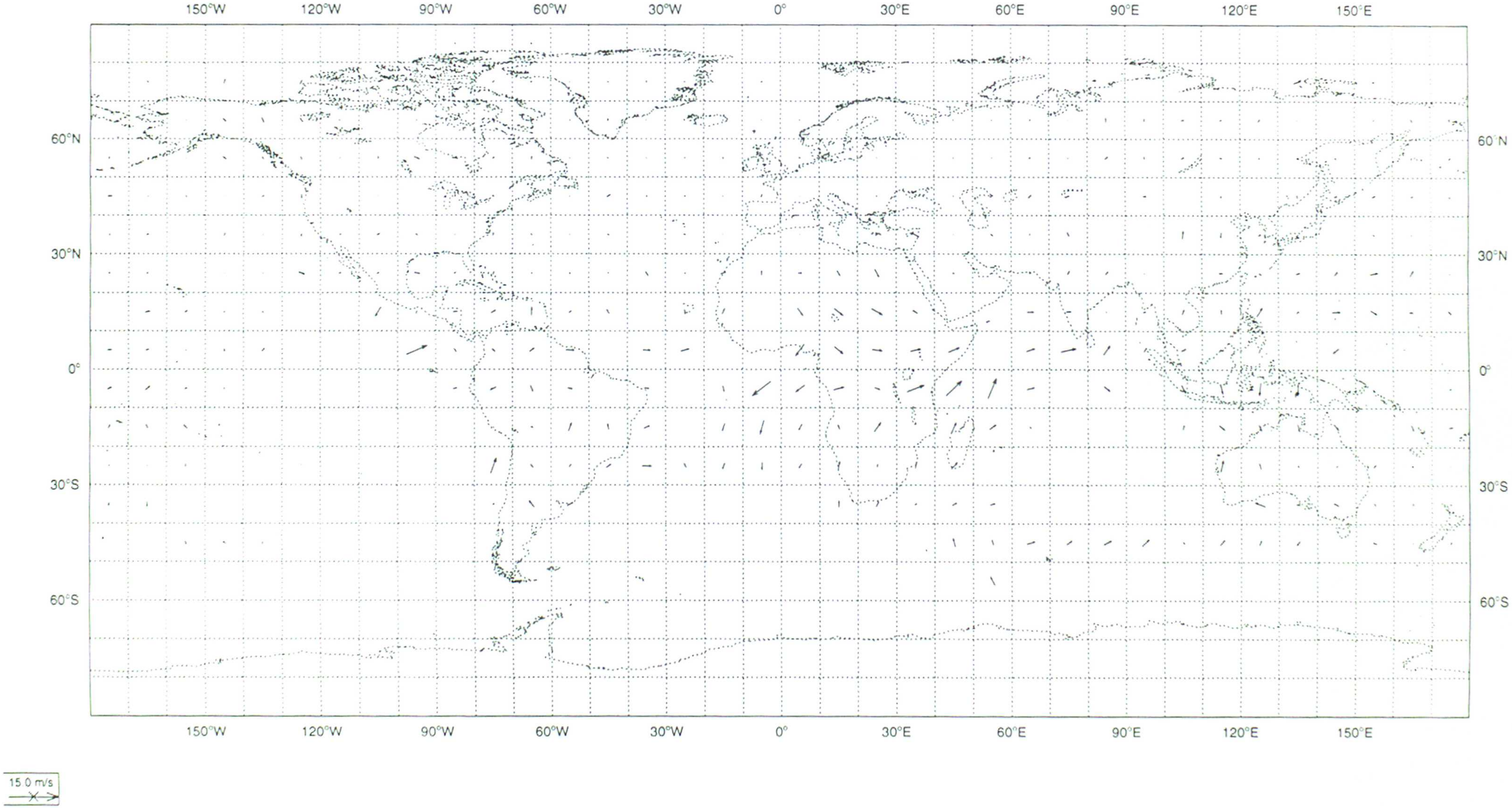

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0 m/s

Figure 5b. AIRCRAFT 1000 - 301 hPa mean O-B winds. JULY 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

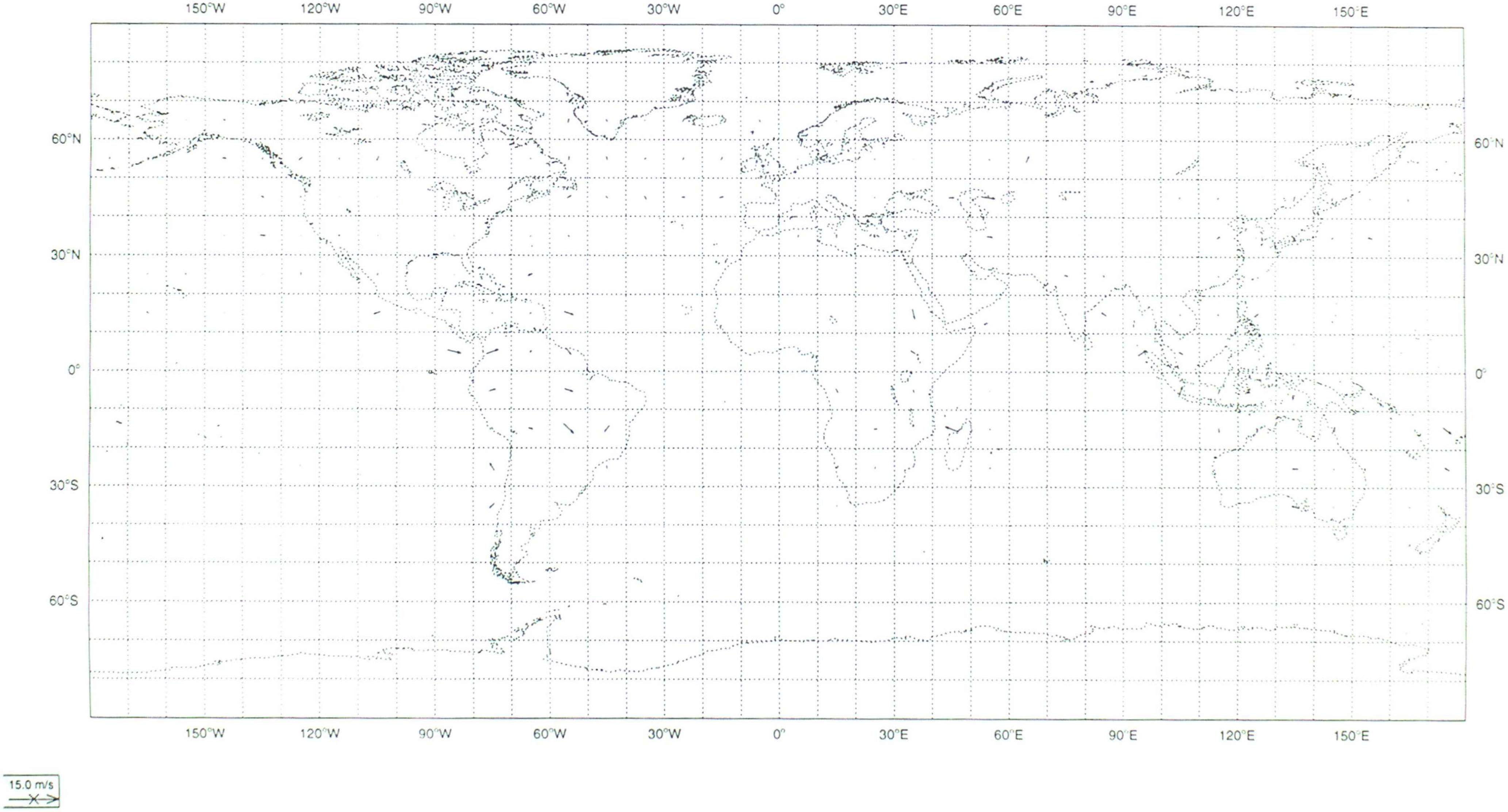

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0 m/s

Figure 6a. AIRCRAFT 300 - 150 hPa mean O-B speeds (ms-1). JULY 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

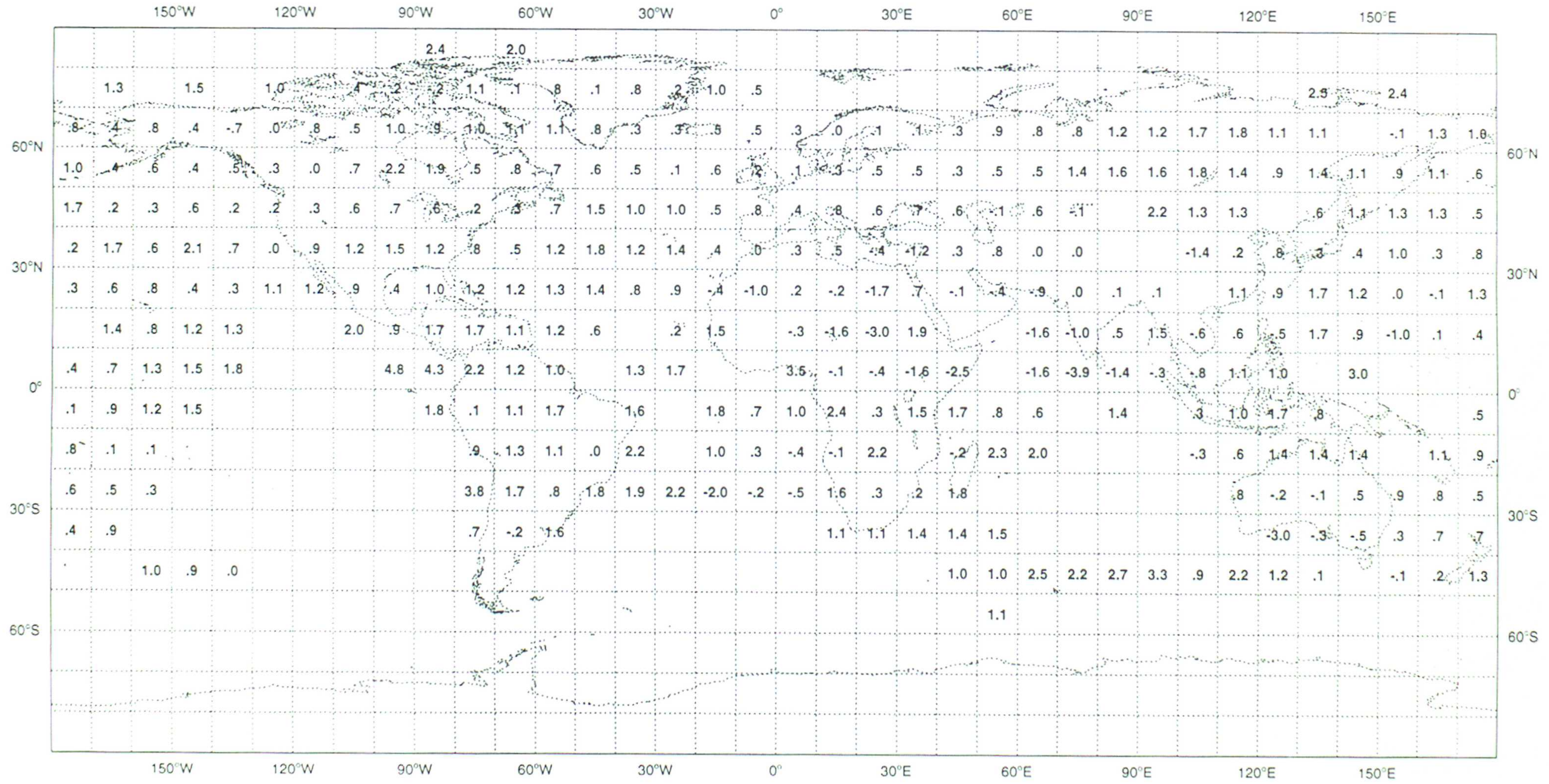

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
2.4 2.0
1.3 1.5 1.0 .4 .2 .2 1.1 .1 .8 .1 .8 .2 1.0 .5 2.5 2.4
.8 .4 .8 .4 -.7 .0 .8 .5 1.0 .9 1.0 1.1 1.1 .8 .3 .3 .5 .5 .3 .0 .1 .1 .3 .9 .8 .8 1.2 1.2 1.7 1.8 1.1 1.1 -.1 1.3 1.8
1.0 .4 .6 .4 .5 .3 .0 .7 2.2 1.9 .5 .8 .7 .6 .5 .1 .6 .2 .1 .3 .5 .5 .3 .5 .5 1.4 1.6 1.6 1.8 1.4 .9 1.4 1.1 .9 1.1 .6
1.7 .2 .3 .6 .2 .2 .3 .6 .7 .6 .2 .3 .7 1.5 1.0 1.0 .5 .8 .4 .8 .6 .7 .6 -.1 .6 -.1 2.2 1.3 1.3 .6 1.1 1.3 1.3 .5
.2 1.7 .6 2.1 .7 .0 .9 1.2 1.5 1.2 .8 .5 1.2 1.8 1.2 1.4 .4 .0 .3 .5 .4 1.2 .3 .8 .0 .0 -1.4 .2 .8 .3 .4 1.0 .3 .8
.3 .6 .8 .4 .3 1.1 1.2 .9 .4 1.0 1.2 1.2 1.3 1.4 .8 .9 -.4 -1.0 .2 -.2 -1.7 .7 -.1 -.4 -.9 .0 .1 .1 1.1 .9 1.7 1.2 .0 -.1 1.3
1.4 .8 1.2 1.3 2.0 .9 1.7 1.7 1.1 1.2 .6 .2 1.5 -.3 -1.6 -3.0 1.9 -1.6 -1.0 .5 1.5 -.6 .6 -.5 1.7 .9 -1.0 .1 .4
.4 .7 1.3 1.5 1.8 4.8 4.3 2.2 1.2 1.0 1.3 1.7 3.5 -.1 -.4 -1.6 -2.5 -1.6 -3.9 -1.4 -.3 -.8 1.1 1.0 3.0
.1 .9 1.2 1.5 1.8 .1 1.1 1.7 1.6 1.8 .7 1.0 2.4 .3 1.5 1.7 .8 .6 1.4 .3 1.0 1.7 .8 .5
.8 .1 .1 .9 1.3 1.1 .0 2.2 1.0 .3 -.4 -.1 2.2 -.2 2.3 2.0 -.3 .6 1.4 1.4 1.4 1.1 .9
.6 .5 .3 3.8 1.7 .8 1.8 1.9 2.2 -2.0 -.2 -.5 1.6 .3 .2 1.8 .8 -.2 -.1 .5 .9 .8 .5
.4 .9 .7 -.2 1.6 1.1 1.1 1.4 1.4 1.5 -3.0 -.3 -.5 .3 .7 .7
1.0 .9 .0 1.0 1.0 2.5 2.2 2.7 3.3 .9 2.2 1.2 .1 -.1 .2 1.3
1.1
150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 6b. AIRCRAFT 1000 - 301 hPa mean O-B speeds (ms-1). JULY 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

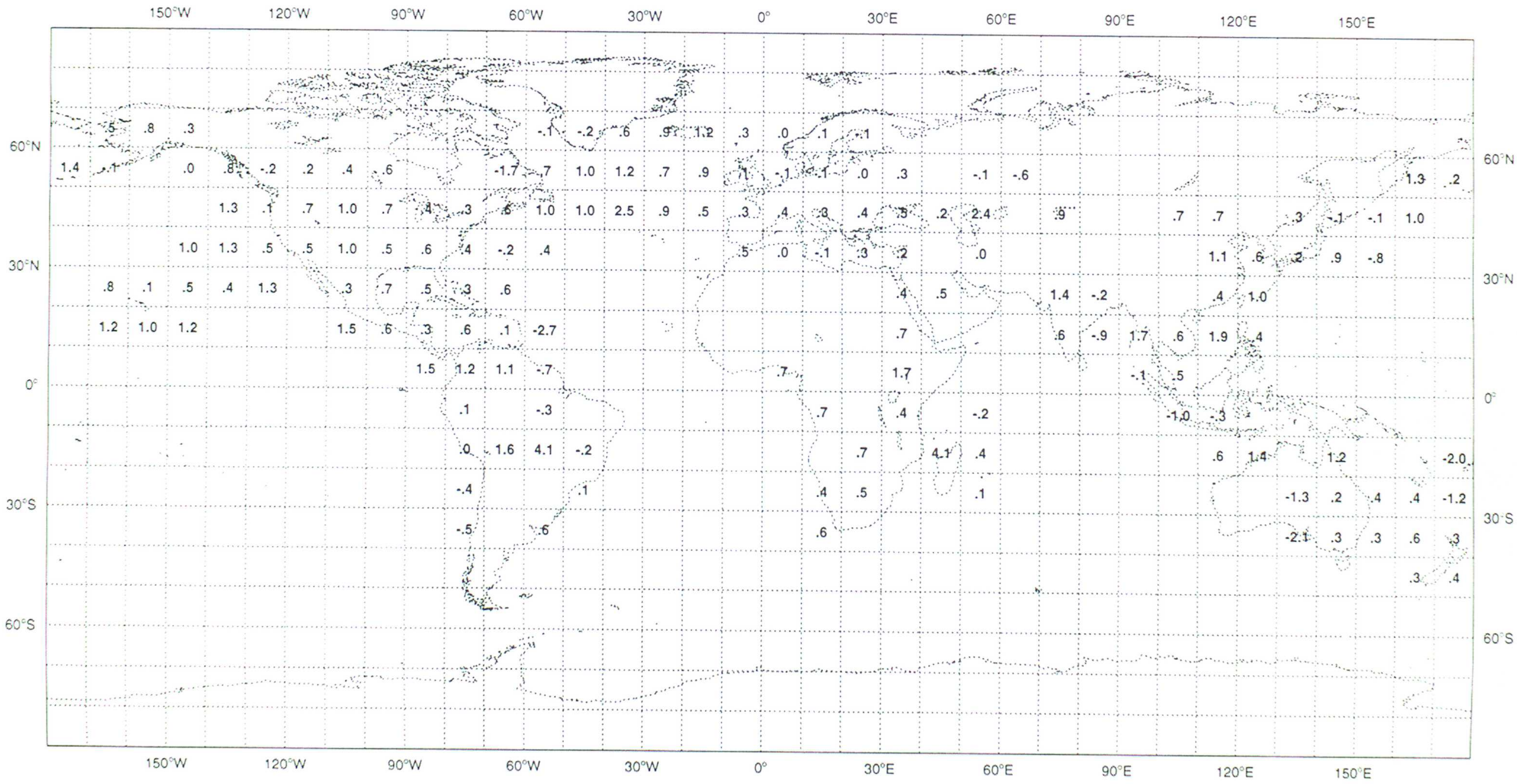

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.5 .8 .3 -.1 -.2 .6 .9 1.2 .3 .0 .1 -.1
1.4 -.1 .0 .8 -.2 .2 .4 .6 -1.7 .7 1.0 1.2 .7 .9 .1 -.1 -.1 .0 .3 -.1 -.6 1.3 .2
1.3 .1 .7 1.0 .7 .4 .3 .6 1.0 1.0 2.5 .9 .5 .3 .4 .3 .4 .5 .2 2.4 .9 .7 .7 .3 .1 -.1 1.0
1.0 1.3 .5 .5 1.0 .5 .6 .4 -.2 .4 .5 .0 -.1 .3 .2 .0 1.1 .6 .2 .9 -.8
.8 .1 .5 .4 1.3 .3 .7 .5 .3 .6 .4 .5 1.4 -.2 .4 1.0
1.2 1.0 1.2 1.5 .6 .3 .6 .1 -2.7 .7 .6 -.9 1.7 .6 1.9 .4
1.5 1.2 1.1 -.7 .7 1.7 -.1 .5
.1 -.3 .7 .4 -.2 -1.0 -.3
.0 1.6 4.1 -.2 .7 4.1 .4 .6 1.4 1.2 -2.0
-.4 .1 .4 .5 .1 -1.3 .2 .4 .4 -1.2
-.5 .6 .6 -2.1 .3 .3 .6 .3
.3 .4

Figure 7a. AIRCRAFT 300 - 150 hPa RMS O-B vector (ms-1). JULY 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

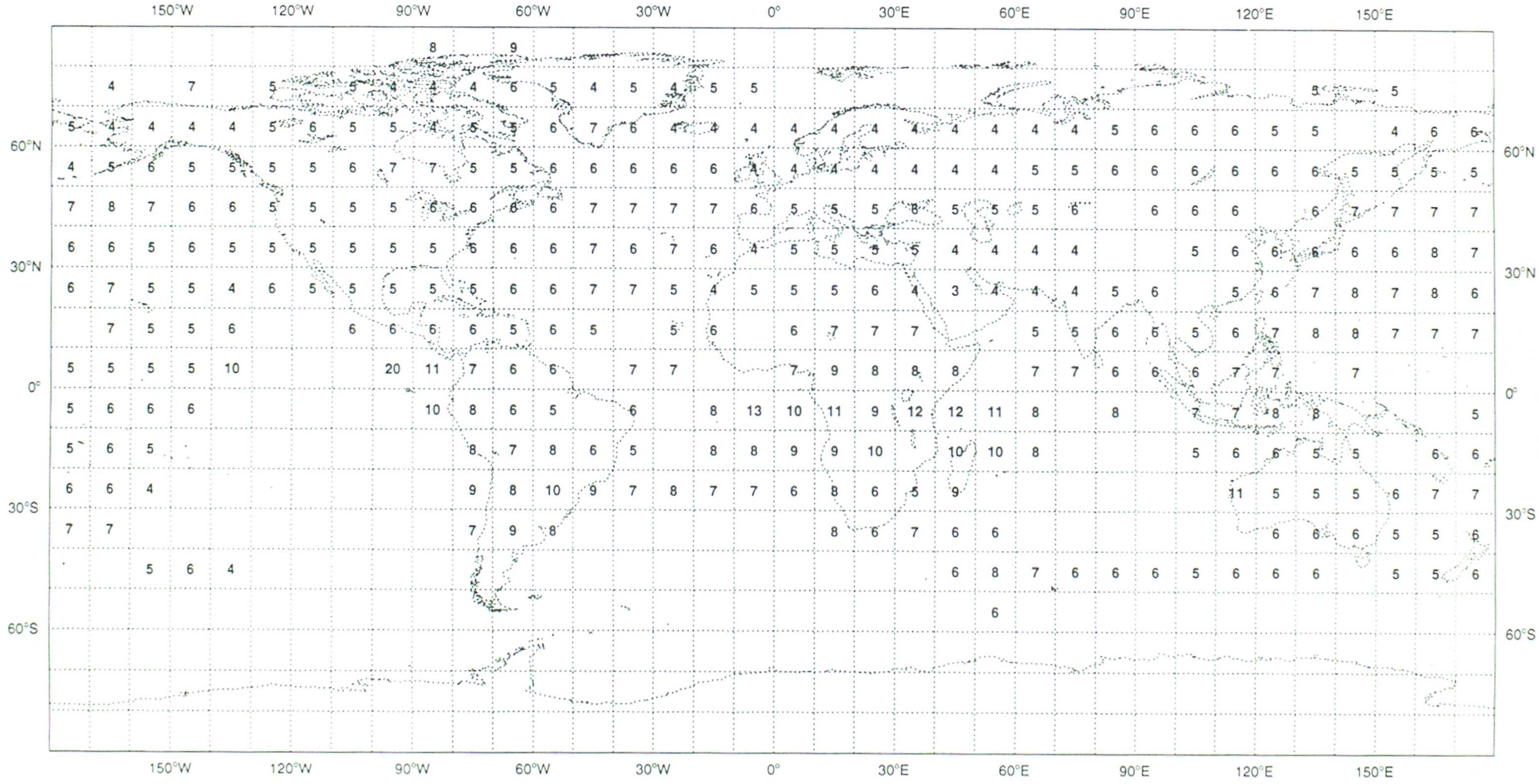

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 7b. AIRCRAFT 1000 - 301 hPa RMS O-B vector (ms-1). JULY 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

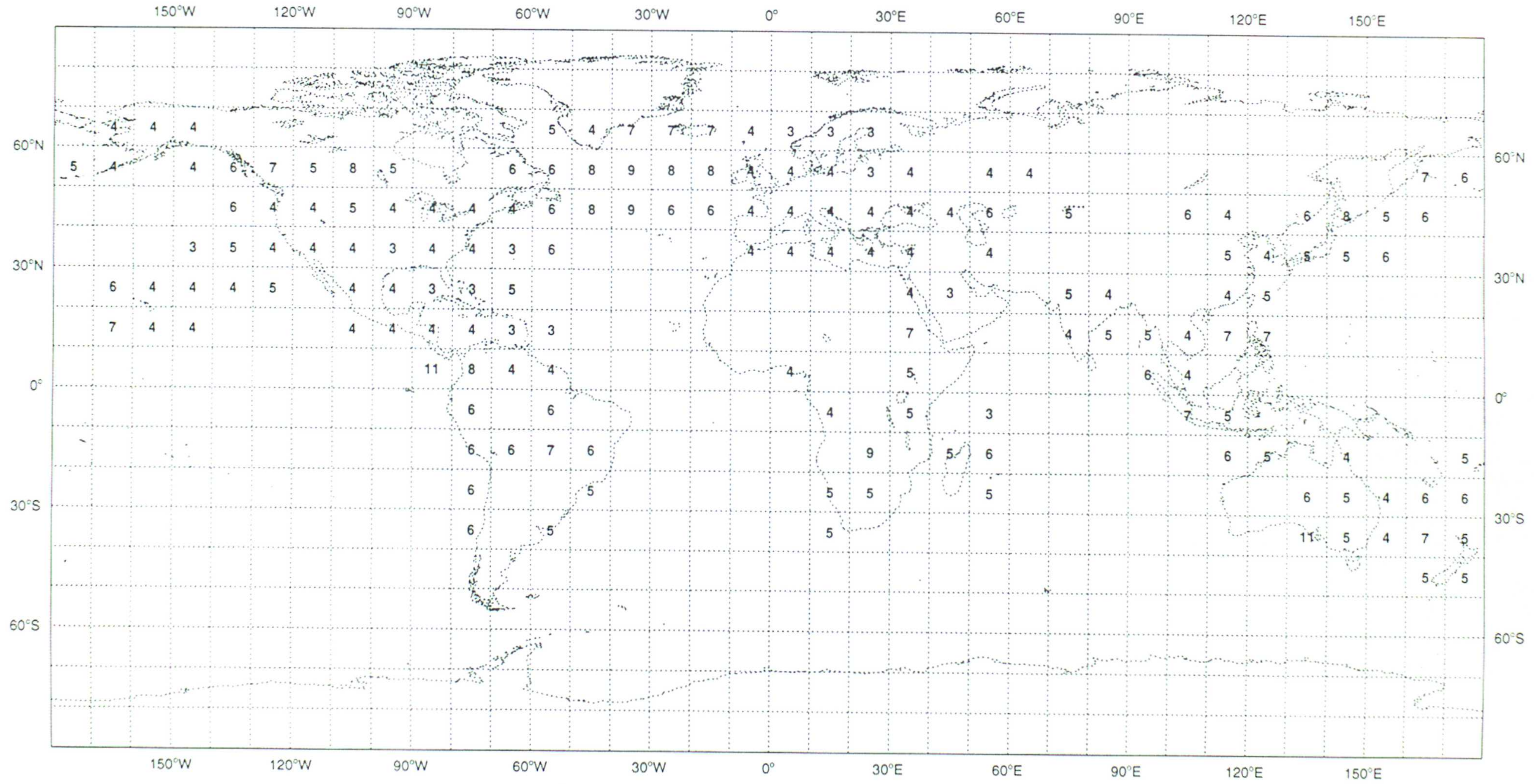

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
4 4 4 5 4 7 7 7 4 3 3 3
5 4 4 6 7 5 8 5 6 6 8 9 8 8 4 4 4 3 4 4 4 7 6
6 4 4 5 4 4 4 4 6 8 9 6 6 4 4 4 4 4 4 6 5 6 4 6 8 5 6
3 5 4 4 4 3 4 4 3 6 4 4 4 4 4 4 5 4 5 5 6
6 4 4 4 5 4 4 3 3 5 4 3 5 4 4 5
7 4 4 4 4 4 4 3 3 7 4 5 5 4 7 7
11 8 4 4 4 5 6 4
6 6 4 5 3 7 5
6 6 7 6 9 5 6 6 5 4 5
6 5 5 5 5 6 5 4 6 6
6 5 5 11 5 4 7 5
5 5

TABLE 5

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: July 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for radiosonde TEMPs.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 1000.0 - 30.0 hPa

Element monitored :GEOPOTENTIAL HEIGHT IN metres

Parameters monitored

:NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:% REJ :Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.

:SD :SD of difference of observations from background values at level shown excluding those with gross errors.

:BIAS :Mean difference of observations from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

:NUM LEVELS :Number of levels satisfying selection criteria.

GROSS ERROR LIMITS :Defined in Appendix I.1

SELECTION CRITERIA : ≥3 levels with ≥10 observations and ≥ 100 m weighted RMS.

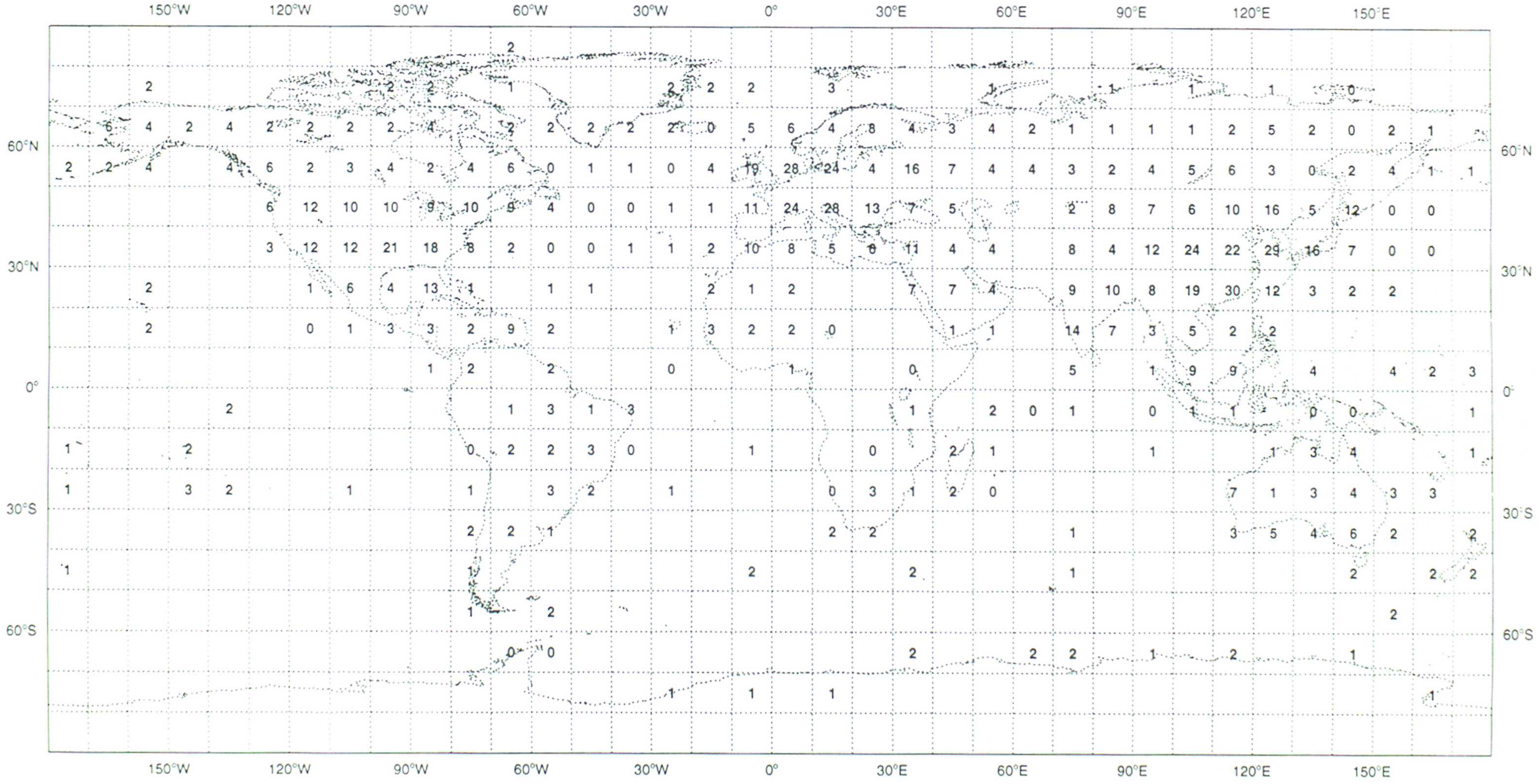
ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
26477	12	Z	100	56/ 31	15	0	69.0	152.5	167.4	9
28698	12	Z	50	55/ 73	30	0	33.4	149.6	153.3	4
28722	12	Z	100	55/ 56	17	0	56.7	106.5	120.6	4
33837	00	Z	50	46/ 31	19	2	121.6	224.1	254.9	5
34247	12	Z	50	50/ 41	28	2	61.1	180.0	190.1	6
40417	12	Z	50	26/ 50	25	0	38.5	190.9	194.7	4
40430	12	Z	50	25/ 40	24	0	30.9	207.2	209.5	5
40437	12	Z	50	25/ 47	15	0	35.5	217.1	219.9	6
41024	12	Z	50	22/ 39	15	0	30.9	164.5	167.4	4
42027	00	Z	150	34/ 75	16	0	100.9	-20.6	102.9	4
42101	00	Z	200	30/ 76	27	0	92.7	-46.9	103.9	5
42182	12	Z	50	29/ 77	19	1	67.9	232.5	242.2	6
42339	00	Z	70	26/ 73	11	4	116.7	160.5	198.5	7
42339	12	Z	70	26/ 73	12	2	75.4	207.1	220.4	6
42361	00	Z	500	26/ 78	25	0	68.4	7.7	68.8	7
42361	12	Z	200	26/ 78	10	0	127.8	28.4	131.0	5
42369	00	Z	50	27/ 81	9	2	76.7	244.1	255.9	10
42369	12	Z	50	27/ 81	4	7	84.7	282.7	295.2	10
42397	00	Z	100	27/ 88	10	0	130.0	16.8	131.1	4
42397	12	Z	50	27/ 88	11	0	103.4	182.8	210.0	6
42410	00	Z	50	26/ 92	17	1	90.2	157.4	181.4	6
42492	00	Z	50	26/ 85	11	0	60.6	170.6	181.1	5
42492	12	Z	100	26/ 85	18	0	111.6	91.9	144.5	7
42647	00	Z	100	23/ 73	16	0	148.0	16.3	148.9	7
42647	12	Z	70	23/ 73	9	3	102.4	226.1	248.2	9
42701	00	Z	150	23/ 85	10	2	115.7	81.0	141.3	4
42701	12	Z	100	23/ 85	12	0	72.9	146.5	163.7	4
42724	12	Z	100	24/ 91	18	0	126.1	-29.5	129.5	5
42809	00	Z	30	23/ 88	12	1	94.3	257.2	274.0	5
42809	12	Z	100	23/ 88	28	0	83.4	-111.3	139.1	4
42867	00	Z	50	21/ 79	13	2	122.2	213.5	246.0	9
42867	12	Z	50	21/ 79	10	0	99.7	223.7	244.9	10
42971	00	Z	50	20/ 86	16	2	86.2	158.6	180.5	5
43003	00	Z	150	19/ 73	20	0	103.3	-29.5	107.4	4
43003	12	Z	50	19/ 73	4	6	55.4	257.7	263.6	8
43128	00	Z	100	17/ 78	15	0	111.1	-73.7	133.3	5
43128	12	Z	50	17/ 78	10	0	106.5	248.0	269.9	5
43185	00	Z	50	16/ 81	11	0	83.9	199.3	216.2	4
43185	12	Z	70	16/ 81	11	0	77.7	220.5	233.7	7
43192	00	Z	150	15/ 74	22	0	75.1	-61.5	97.1	4
43192	12	Z	50	15/ 74	10	1	127.4	138.6	188.2	9
43285	12	Z	30	13/ 75	14	0	88.5	307.9	320.3	5
43346	00	Z	100	11/ 80	29	0	97.5	-106.1	144.1	4
43353	12	Z	150	10/ 76	18	0	91.3	66.2	112.7	4
43371	12	Z	70	8/ 77	16	0	117.7	152.5	192.7	7
50527	00	Z	50	49/ 120	29	0	63.5	150.1	163.0	5
53915	12	Z	1000	36/ 107	29	0	14.1	27.5	30.9	4
56964	12	Z	1000	23/ 101	30	0	8.2	32.0	33.0	4
58203	12	Z	70	33/ 116	28	1	37.3	135.0	140.1	4
58968	00	Z	250	25/ 122	29	0	25.6	-67.8	72.5	4
83612	12	Z	70	-20/ -55	13	0	84.5	158.2	179.3	4
91366	00	Z	50	9/ 168	25	0	62.9	163.0	174.7	5

Figure 8. TEMP 500 hPa geopotential mean daily count. JULY 2002

All hours

Global average number of observations in 24 hours = 1171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60°N
30°N
0°
30°S
60°S
2
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6 4 2 4 2 2 2 2 4 2 2 2 2 2 0 5 6 4 8 4 3 4 2 1 1 1 1 2 5 2 0 2 1
2 2 4 4 6 2 3 4 2 4 6 0 1 1 0 4 19 28 24 4 16 7 4 4 3 2 4 5 6 3 0 2 4 1 1
6 12 10 10 9 10 9 4 0 0 1 1 11 24 28 13 7 5 2 8 7 6 10 16 5 12 0 0
3 12 12 21 18 8 2 0 0 1 1 2 10 8 5 6 11 4 4 8 4 12 24 22 29 16 7 0 0
2 1 6 4 13 1 1 1 2 1 2 7 7 4 9 10 8 19 30 12 3 2 2
2 0 1 3 3 2 9 2 1 3 2 2 0 1 1 14 7 3 5 2 2
1 2 2 0 1 0 5 1 9 9 4 4 2 3
2 1 3 1 3 1 2 0 1 0 1 1 0 0 1
1 2 0 2 2 3 0 1 0 2 1 1 1 3 4 1
1 3 2 1 1 3 2 1 0 3 1 2 0 7 1 3 4 3 3
2 2 1 2 2 1 3 5 4 6 2 2
1 1 2 2 1 2 2 2
1 2 2
0 0 2 2 2 1 2 1
1 1 1 1

TABLE 6

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: July 2002

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 1000.0 - 100.0 hPa
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored		
	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.2	
SELECTION CRITERIA	: ≥ 10 observations and ≥ 15 m s^{-1} RMS vector wind.	

ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS
PSPIU	00	V	150	-5/ -81	22	0	100	-10.8	3.3	27.3	2
PSPIU	12	V	100	-5/ -81	22	0	100	-7.4	1.0	19.3	2
17351	12	V	250	37/ 35	29	0	100	-9.4	-1.8	15.6	1
38341	00	V	150	43/ 71	21	0	100	-2.3	-11.4	15.5	1
40809	12	V	400	33/ 59	11	0	100	2.0	-2.4	16.9	1
41594	12	V	100	32/ 73	13	0	100	16.4	0.7	21.2	1
42339	00	V	250	26/ 73	10	0	100	-3.0	6.0	15.9	1
42379	00	V	150	27/ 83	11	0	100	-2.2	5.4	16.8	1
42667	00	V	250	23/ 77	12	0	100	-2.7	0.4	15.9	1
43346	00	V	100	11/ 80	27	0	48	14.9	0.5	18.0	1
43369	12	V	150	8/ 73	10	0	10	4.4	10.8	15.7	1
43371	00	V	100	8/ 77	22	0	0	11.4	3.5	15.7	1
48407	12	V	100	15/ 105	24	0	100	11.7	0.2	16.3	1
48455	12	V	100	14/ 101	26	0	100	16.5	5.7	20.4	1
48568	12	V	150	7/ 101	10	0	20	6.3	13.3	17.7	1
60360	12	V	150	37/ 8	13	0	100	17.1	-3.5	24.2	2
63741	00	V	150	-1/ 37	29	0	100	10.2	0.8	21.0	3
63985	00	V	100	-5/ 55	28	0	100	7.5	3.8	15.3	1
63985	12	V	150	-5/ 55	25	0	100	0.3	-3.8	17.1	1
67197	12	V	200	-25/ 47	21	0	9	-6.3	1.2	15.5	1
68174	12	V	200	-24/ 29	19	0	100	-12.4	1.7	16.8	1
68442	12	V	250	-29/ 26	16	0	100	-25.5	-3.1	32.1	4
68461	12	V	100	-28/ 28	8	3	100	4.3	13.1	24.7	5
68512	12	V	200	-30/ 18	16	0	100	-12.6	-1.3	16.7	2
83612	12	V	100	-20/ -55	21	0	100	10.4	-3.9	23.4	3
96935	00	V	300	-7/ 113	12	0	25	0.9	2.1	24.7	1
98223	00	V	100	18/ 121	15	0	100	-13.4	-1.7	23.2	3

Figure 9. TEMP/PILOT 300 hPa wind mean daily count. JULY 2002
All hours
Global average number of observations in 24 hours = 1366

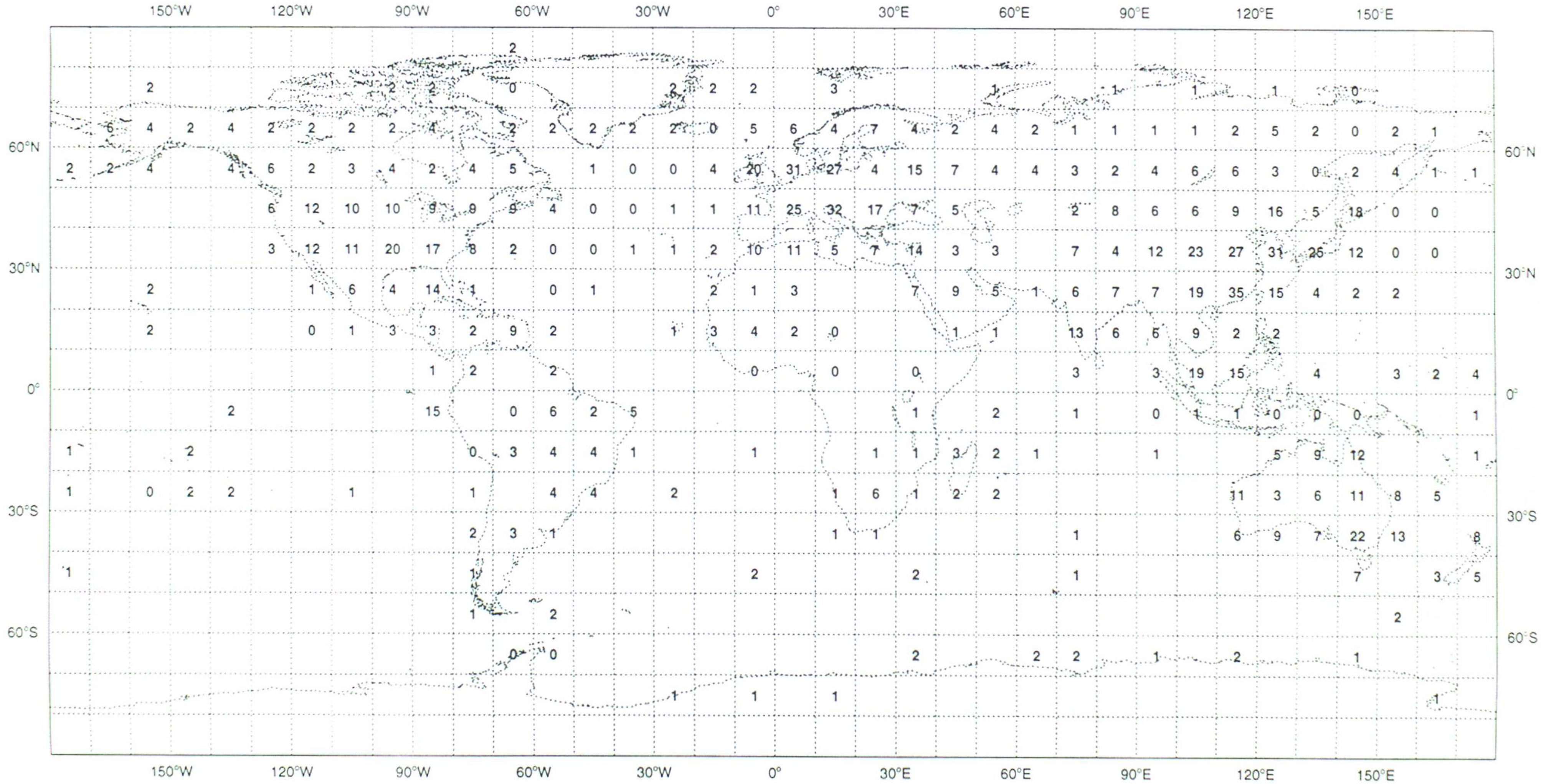

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
2
2 2 2 0 2 2 2 3 1 1 1 1 0
6 4 2 4 2 2 2 2 4 2 2 2 2 2 0 5 6 4 7 4 2 4 2 1 1 1 1 2 5 2 0 2 1
2 2 4 4 6 2 3 4 2 4 5 1 0 0 4 20 31 27 4 15 7 4 4 3 2 4 6 6 3 0 2 4 1 1
6 12 10 10 9 9 9 4 0 0 1 1 11 25 32 17 7 5 2 8 6 6 9 16 5 18 0 0
3 12 11 20 17 8 2 0 0 1 1 2 10 11 5 7 14 3 3 7 4 12 23 27 31 25 12 0 0
2 1 6 4 14 1 0 1 2 1 3 7 9 5 1 6 7 7 19 35 15 4 2 2
2 0 1 3 3 2 9 2 1 3 4 2 0 1 1 13 6 5 9 2 2
1 2 2 0 0 0 3 3 19 15 4 3 2 4
2 15 0 6 2 5 1 2 1 0 1 1 0 0 0 1
1 2 0 3 4 4 1 1 1 1 3 2 1 1 5 9 12 1
1 0 2 2 1 1 4 4 2 1 6 1 2 2 11 3 6 11 8 5
2 3 1 1 1 1 6 9 7 22 13 8
1 1 2 2 1 7 3 5
1 2 2
0 0 2 2 2 1 2 1
1 1 1 1

TABLE 7

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: July 2002

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from each unique identifier for radiosonde TEMPs.
Area monitored	:90°N - 90°S, 180°W - 180°E.
Standard of comparison	:Background field from UKMO global model.
Observation times	:00 UTC and 12 UTC.
Level(s) monitored	:Standard levels between 500.0 - 150.0 hPa
Element monitored	:WIND DIRECTION in degrees

Parameters monitored

:NUM OBS	:Average number of observations at all levels.
:BIAS	:Mean difference of observations from background values from all levels.
:MAX SPREAD	:(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels
:SD	:SD of difference of observations from background values at all levels.

SELECTION CRITERIA :NUM OBS ≥ 5, and
ABSOLUTE BIAS ≥ 10°, with
SD < 30°, and
MAX SPREAD < 10°

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
OXYH2	00	DD	58/ -36	8	-11.0	8.7	24.6
10468	00	DD	52/ 12	26	12.1	4.8	12.3
10468	12	DD	52/ 12	26	11.7	3.7	11.5
29612	12	DD	55/ 78	21	18.6	4.0	11.3
38341	00	DD	43/ 71	17	27.2	5.1	20.3
42027	12	DD	34/ 75	5	-20.1	8.8	13.5
62337	12	DD	31/ 34	24	-14.6	4.9	12.5
65548	12	DD	7/ -8	9	-12.9	5.8	25.2
92044	00	DD	-2/ 147	7	11.1	7.1	19.8

MONITORING OF SATELLITE WINDS

MONITORING CENTRE: BRACKNELL

MONTH: July 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from GOES-8, GOES-10, METEOSAT-5, METEOSAT-7, GMS-5, INSAT.

Standard of comparison :Background field from UKMO global model.

Selection Criteria :number of observations > 10.

Data Extracted :Layer 701 - 1000 hPa
401 - 700 hPa
101 - 400 hPa

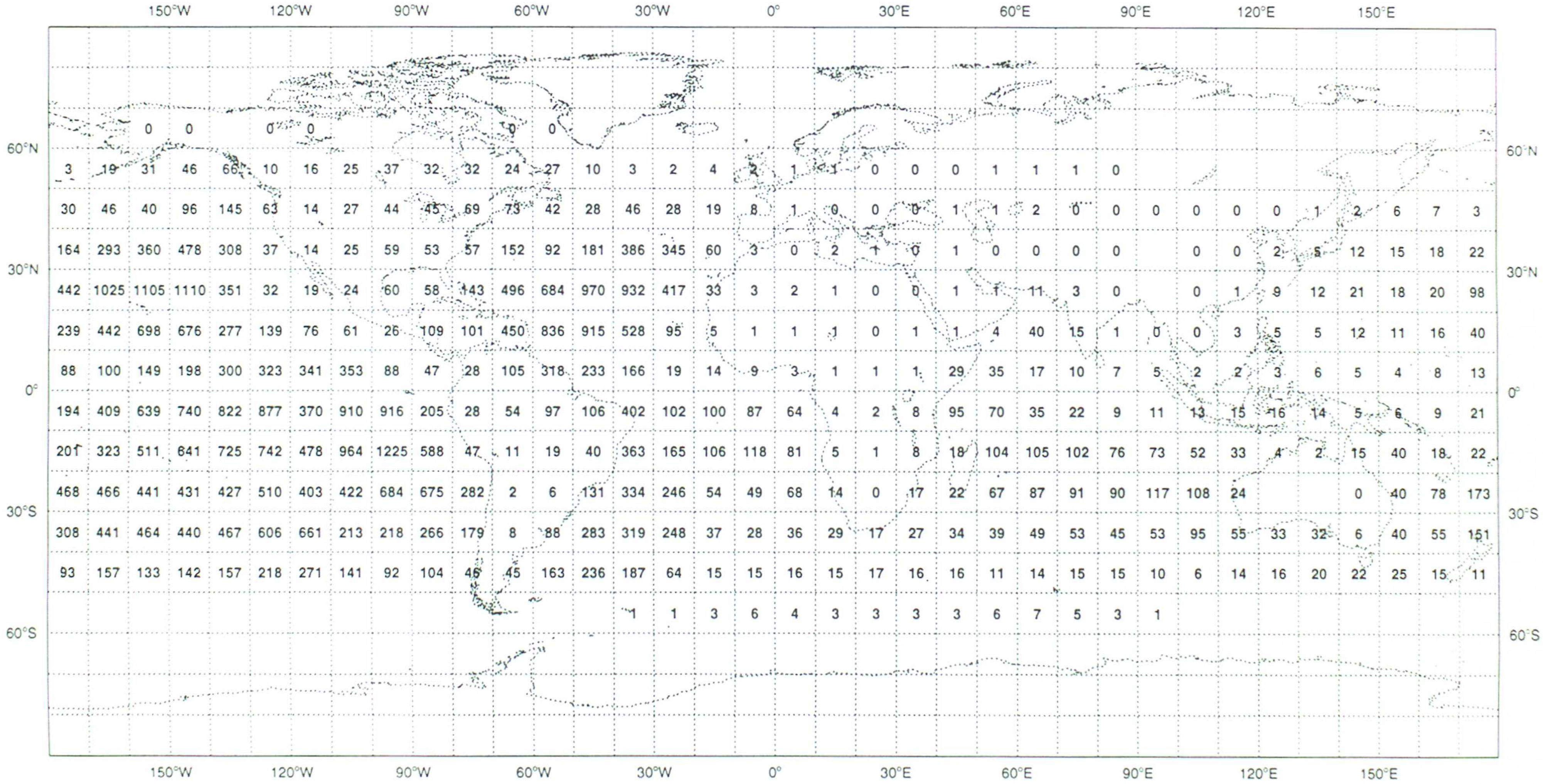
:Mean wind

:Mean observation minus background vector wind differences

:Mean observation minus background speed differences

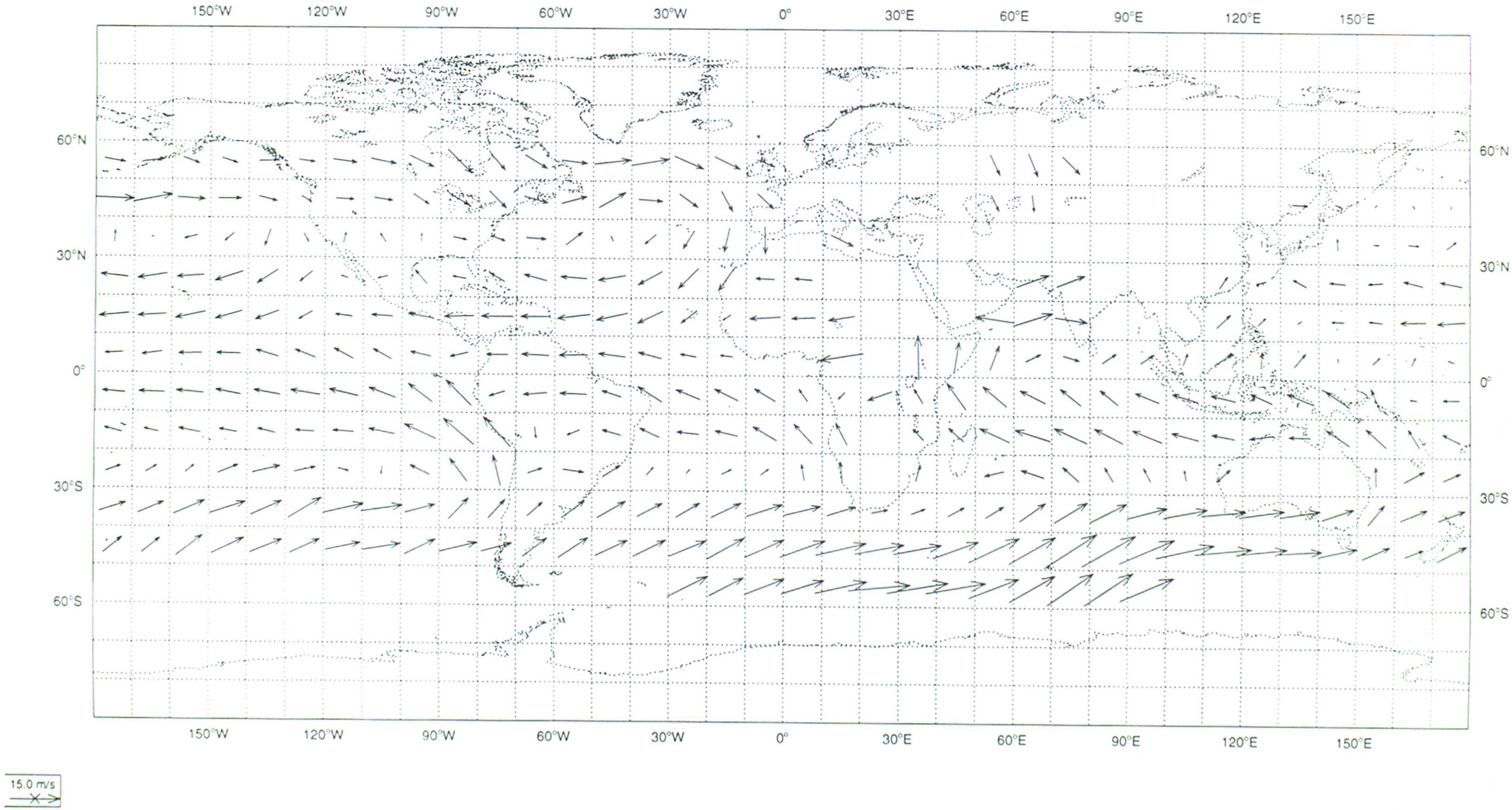
:RMS of observation minus background vector differences

Figure 10. SATOB 701 - 1000 hPa mean daily count. JULY 2002
Global average number of observations in 24 hours = 52644



		0	0		0	0					0	0																							
3	19	31	46	66	10	16	25	37	32	32	24	27	10	3	2	4	2	1	1	0	0	0	1	1	1	0									
30	46	40	96	145	63	14	27	44	45	69	73	42	28	46	28	19	8	1	0	0	0	1	1	2	0	0	0	0	0	0	1	2	6	7	3
164	293	360	478	308	37	14	25	59	53	57	152	92	181	386	345	60	3	0	2	1	0	1	0	0	0	0		0	0	2	5	12	15	18	22
442	1025	1105	1110	351	32	19	24	60	58	143	496	684	970	932	417	33	3	2	1	0	0	1	1	11	3	0		0	1	9	12	21	18	20	98
239	442	698	676	277	139	76	61	26	109	101	450	836	915	528	95	5	1	1	1	0	1	1	4	40	15	1	0	0	3	5	5	12	11	16	40
88	100	149	198	300	323	341	353	88	47	28	105	318	233	166	19	14	9	3	1	1	1	29	35	17	10	7	5	2	2	3	6	5	4	8	13
194	409	639	740	822	877	370	910	916	205	28	54	97	106	402	102	100	87	64	4	2	8	95	70	35	22	9	11	13	15	16	14	5	6	9	21
201	323	511	641	725	742	478	964	1225	588	47	11	19	40	363	165	106	118	81	5	1	8	18	104	105	102	76	73	52	33	4	2	15	40	18	22
468	466	441	431	427	510	403	422	684	675	282	2	6	131	334	246	54	49	68	14	0	17	22	67	87	91	90	117	108	24			0	40	78	173
308	441	464	440	467	606	661	213	218	266	179	8	88	283	319	248	37	28	36	29	17	27	34	39	49	53	45	53	95	55	33	32	6	40	55	151
93	157	133	142	157	218	271	141	92	104	46	45	163	236	187	64	15	15	16	15	17	16	16	11	14	15	15	10	6	14	16	20	22	25	15	11
														1	1	3	6	4	3	3	3	3	6	7	5	3	1								

Figure 11. SATOB 701 - 1000 hPa vector mean wind. JULY 2002
All observations
Arrows are plotted where greater than 10 obs are present


150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0 m/s

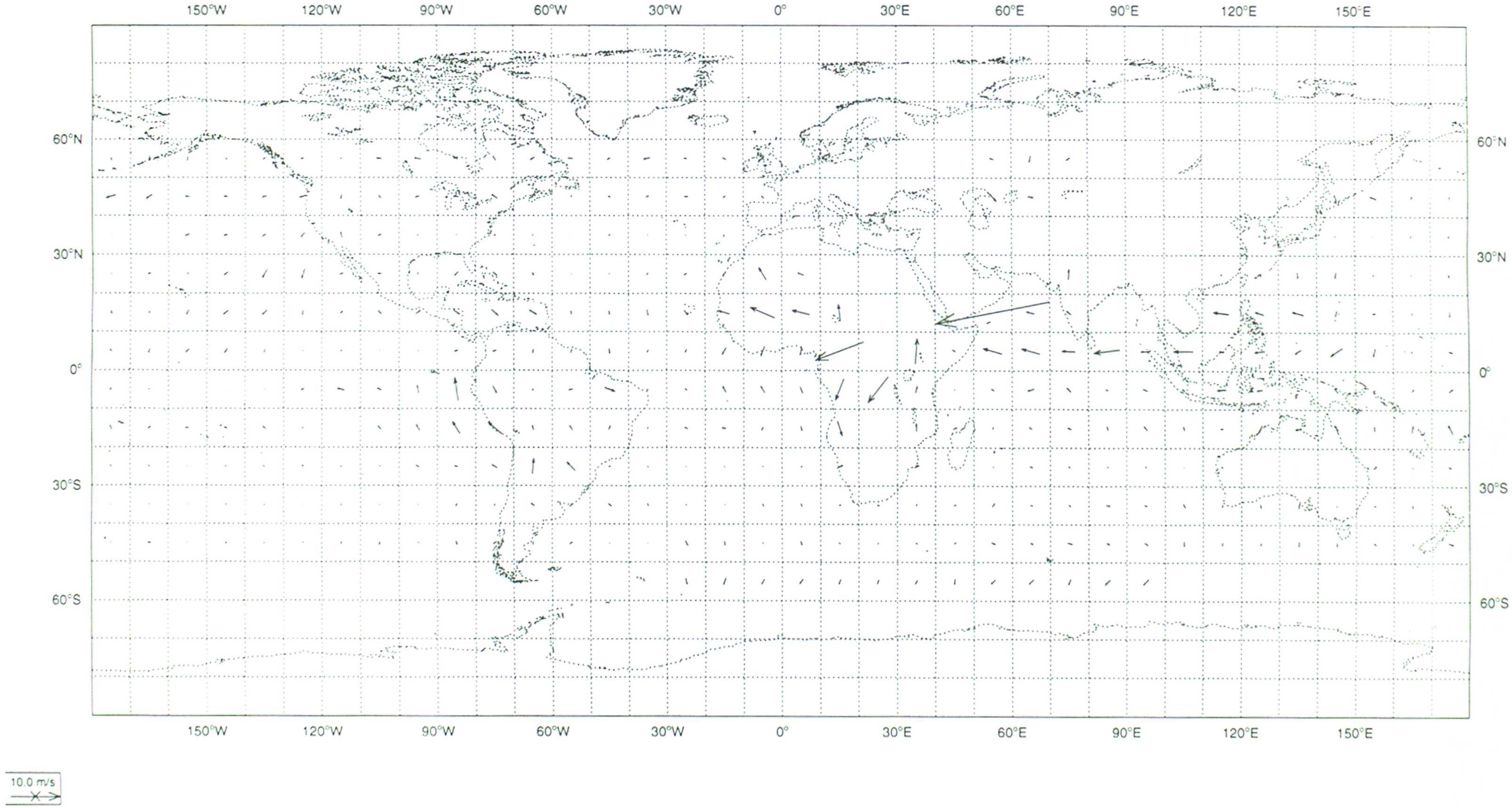


Figure 12. SATOB 701 - 1000 hPa vector wind differences. JULY 2002
All observations
Arrows are plotted where greater than 10 obs are present

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0 m/s

Figure 13. SATOB 701 - 1000 hPa mean O-B speed differences (ms-1). JULY 2002

All observations

Values are plotted where greater than 10 obs are present

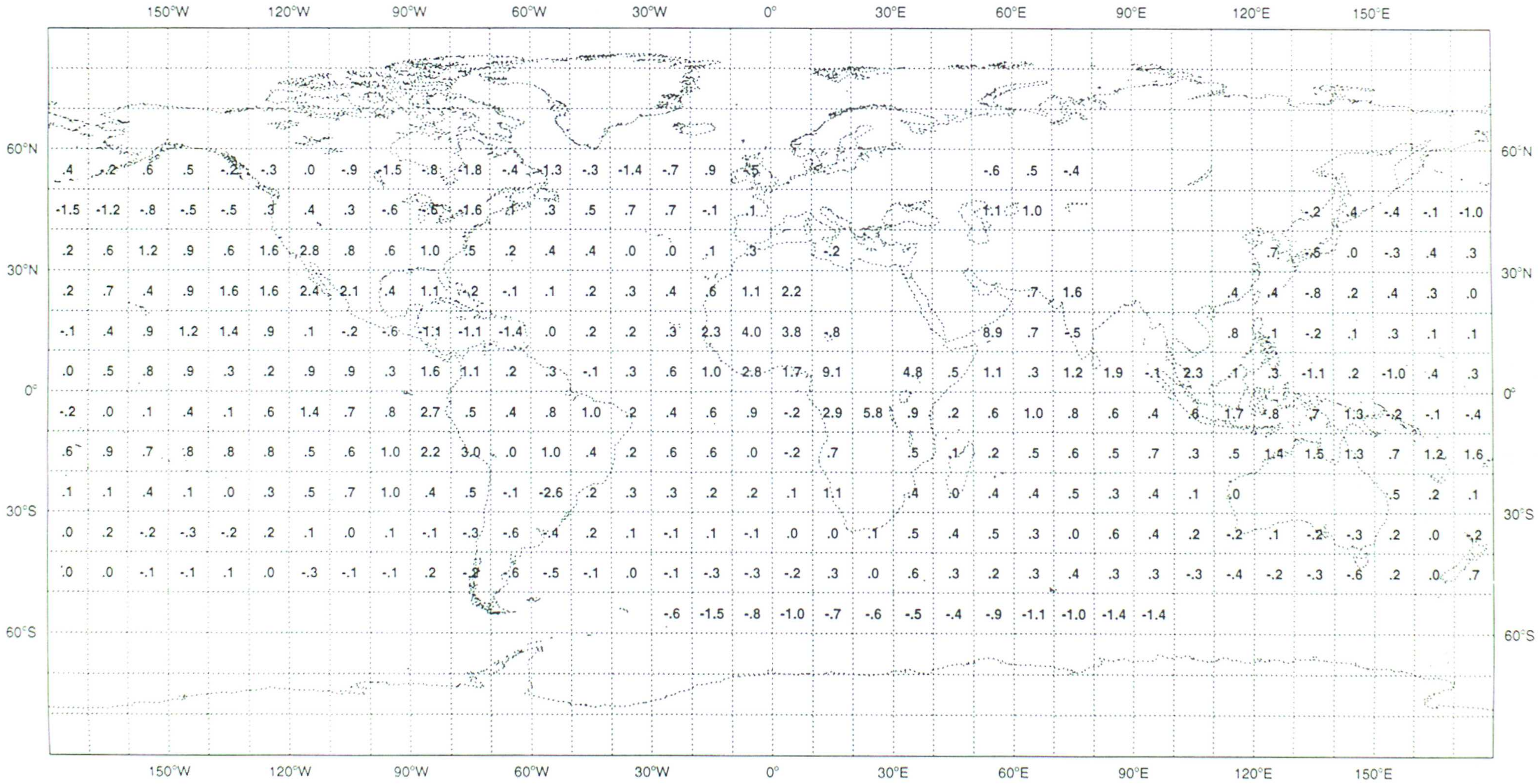

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
.4 .2 .6 .5 -.2 -.3 .0 -.9 -1.5 -.8 -1.8 -.4 -1.3 -.3 -1.4 -.7 .9 .5 -.6 .5 -.4
-1.5 -1.2 -.8 -.5 -.5 .3 .4 .3 -.6 -.6 -1.6 .1 .3 .5 .7 .7 -.1 .1 1.1 1.0 -.2 .4 -.4 -.1 -1.0
.2 .6 1.2 .9 .6 1.6 2.8 .8 .6 1.0 .5 .2 .4 .4 .0 .0 .1 .3 -.2 .7 .6 .0 -.3 .4 .3
.2 .7 .4 .9 1.6 1.6 2.4 2.1 .4 1.1 -.2 -.1 .1 .2 .3 .4 .6 1.1 2.2 .7 1.6 .4 .4 -.8 .2 .4 .3 .0
-.1 .4 .9 1.2 1.4 .9 .1 -.2 -.6 -1.1 -1.1 -1.4 .0 .2 .2 .3 2.3 4.0 3.8 -.8 8.9 .7 -.5 .8 -.1 -.2 .1 .3 .1 .1
.0 .5 .8 .9 .3 .2 .9 .9 .3 1.6 1.1 .2 .3 -.1 .3 .6 1.0 2.8 1.7 9.1 4.8 .5 1.1 .3 1.2 1.9 -.1 2.3 .1 .3 -1.1 .2 -1.0 .4 .3
-.2 .0 .1 .4 .1 .6 1.4 .7 .8 2.7 .5 .4 .8 1.0 .2 .4 .6 .9 -.2 2.9 5.8 .9 .2 .6 1.0 .8 .6 .4 .6 1.7 .8 .7 1.3 -.2 -.1 -.4
.6 .9 .7 .8 .8 .8 .5 .6 1.0 2.2 3.0 .0 1.0 .4 .2 .6 .6 .0 -.2 .7 .5 .1 .2 .5 .6 .5 .7 .3 .5 1.4 1.5 1.3 .7 1.2 1.6
.1 .1 .4 .1 .0 .3 .5 .7 1.0 .4 .5 -.1 -2.6 .2 .3 .3 .2 .2 .1 1.1 .4 .0 .4 .4 .5 .3 .4 .1 .0 .5 .2 .1
.0 .2 -.2 -.3 -.2 .2 .1 .0 .1 -.1 -.3 -.6 -.4 .2 .1 -.1 .1 -.1 .0 .0 .1 .5 .4 .5 .3 .0 .6 .4 .2 -.2 .1 -.2 -.3 .2 .0 -.2
.0 .0 -.1 -.1 .1 .0 -.3 -.1 -.1 .2 -.2 -.6 -.5 -.1 .0 -.1 -.3 -.3 -.2 .3 .0 .6 .3 .2 .3 .4 .3 .3 -.3 -.4 -.2 -.3 -.6 .2 .0 .7
-.6 -1.5 -.8 -1.0 -.7 -.6 -.5 -.4 -.9 -1.1 -1.0 -1.4 -1.4

Figure 14. SATOB 701 - 1000 hPa RMS O-B vector differences (ms-1). JULY 2002

All observations

Values are plotted where greater than 10 obs are present

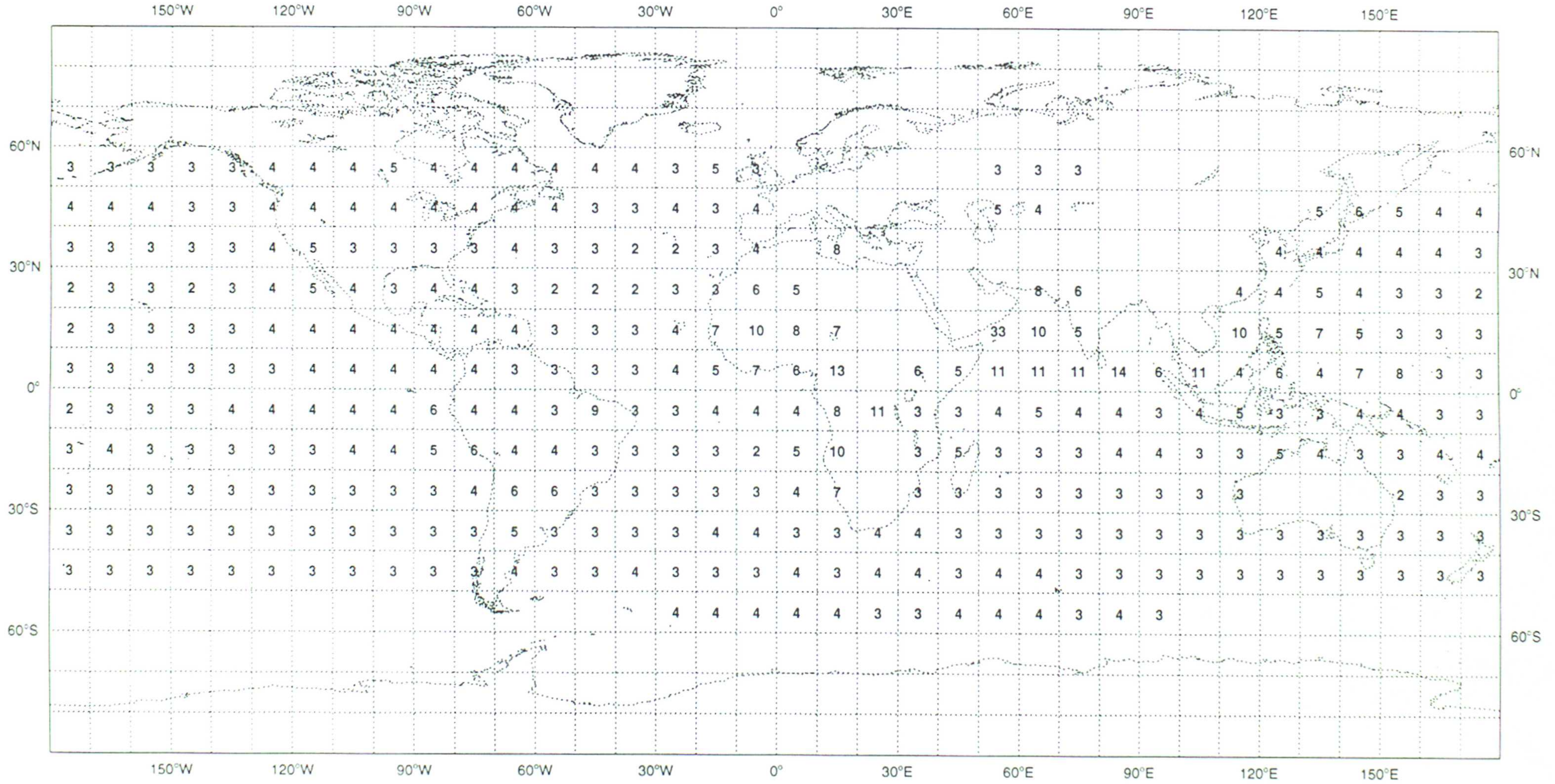

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
3 3 3 3 3 4 4 4 5 4 4 4 4 4 4 3 5 3 3 3 3
4 4 4 3 3 4 4 4 4 4 4 4 4 3 3 4 3 4 5 4 5 6 5 4 4
3 3 3 3 3 4 5 3 3 3 3 4 3 3 2 2 3 4 8 4 4 4 4 4 3
2 3 3 2 3 4 5 4 3 4 4 3 2 2 2 3 3 6 5 8 6 4 4 5 4 3 3 2
2 3 3 3 3 4 4 4 4 4 4 4 3 3 3 4 7 10 8 7 33 10 5 10 5 7 5 3 3 3
3 3 3 3 3 3 4 4 4 4 4 3 3 3 3 4 5 7 6 13 6 5 11 11 11 14 6 11 4 6 4 7 8 3 3
2 3 3 3 4 4 4 4 4 6 4 4 3 9 3 3 4 4 4 8 11 3 3 4 5 4 4 3 4 5 3 3 4 4 3 3
3 4 3 3 3 3 3 4 4 5 6 4 4 3 3 3 3 2 5 10 3 5 3 3 3 4 4 3 3 5 4 3 3 4 4
3 3 3 3 3 3 3 3 3 3 4 6 6 3 3 3 3 3 4 7 3 3 3 3 3 3 3 3 3 2 3 3
3 3 3 3 3 3 3 3 3 3 3 5 3 3 3 3 4 4 3 3 4 4 3 3 3 3 3 3 3 3 3 3 3 3 3 3
3 3 3 3 3 3 3 3 3 3 3 4 3 3 4 3 3 3 4 3 4 4 3 4 4 3 3 3 3 3 3 3 3 3 3 3
4 4 4 4 4 3 3 4 4 4 3 4 3

Figure 15. SATOB 401 - 700 hPa mean daily count. JULY 2002
Global average number of observations in 24 hours = 15645

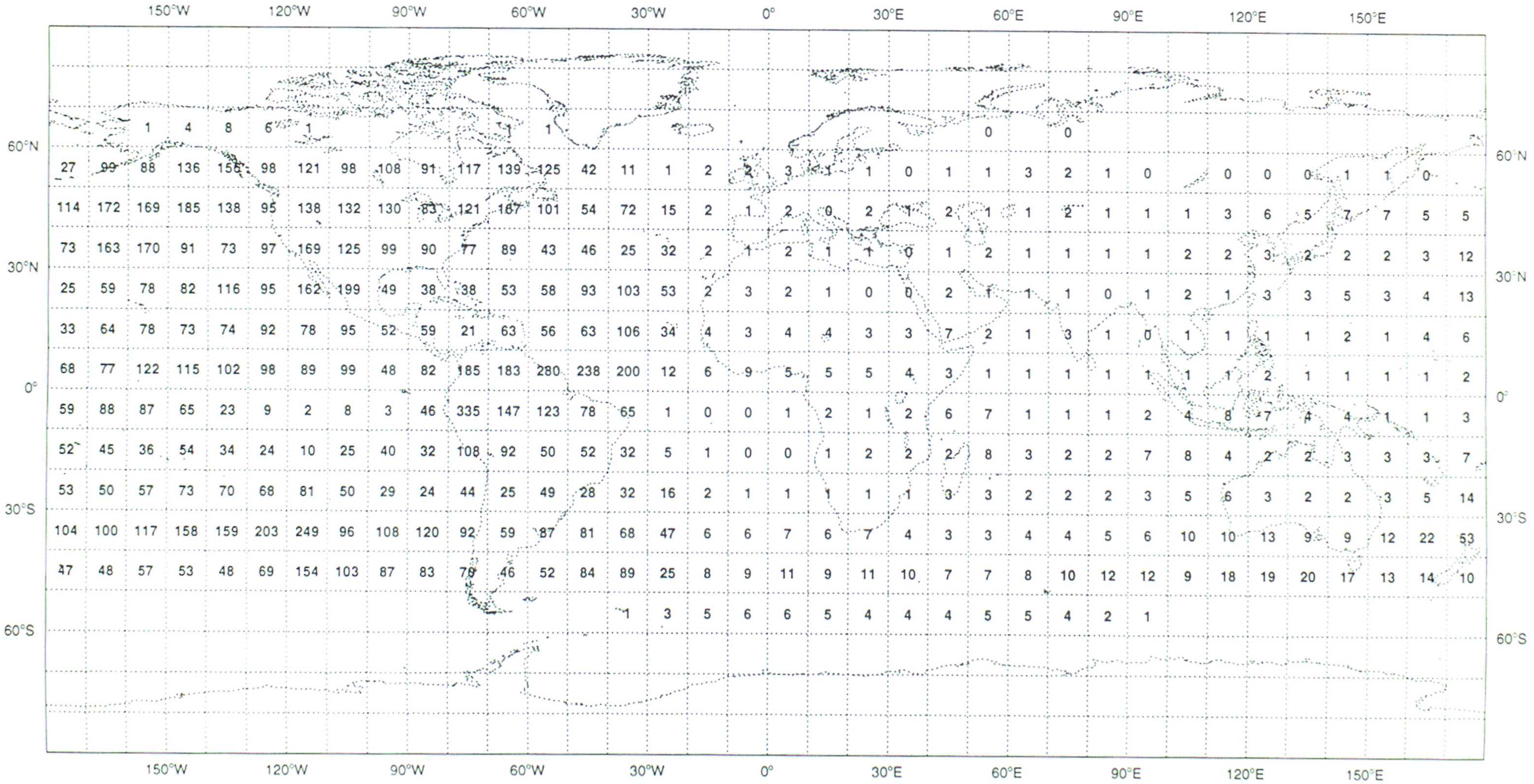

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
1 4 8 6 1 1 1 0 0
27 99 88 136 156 98 121 98 108 91 117 139 125 42 11 1 2 2 3 1 1 0 1 1 3 2 1 0 0 0 0 1 1 0
114 172 169 185 138 95 138 132 130 83 121 167 101 54 72 15 2 1 2 0 2 1 2 1 1 2 1 1 1 3 6 5 7 7 5 5
73 163 170 91 73 97 169 125 99 90 77 89 43 46 25 32 2 1 2 1 1 0 1 2 1 1 1 1 2 2 3 2 2 2 3 12
25 59 78 82 116 95 162 199 49 38 38 53 58 93 103 53 2 3 2 1 0 0 2 1 1 1 0 1 2 1 3 3 5 3 4 13
33 64 78 73 74 92 78 95 52 59 21 63 56 63 106 34 4 3 4 4 3 3 7 2 1 3 1 0 1 1 1 1 2 1 4 6
68 77 122 115 102 98 89 99 48 82 185 183 280 238 200 12 6 9 5 5 5 4 3 1 1 1 1 1 1 1 2 1 1 1 1 2
59 88 87 65 23 9 2 8 3 46 335 147 123 78 65 1 0 0 1 2 1 2 6 7 1 1 1 2 4 8 7 4 4 1 1 3
52 45 36 54 34 24 10 25 40 32 108 92 50 52 32 5 1 0 0 1 2 2 2 8 3 2 2 7 8 4 2 2 3 3 3 7
53 50 57 73 70 68 81 50 29 24 44 25 49 28 32 16 2 1 1 1 1 1 3 3 2 2 2 3 5 6 3 2 2 3 5 14
104 100 117 158 159 203 249 96 108 120 92 59 87 81 68 47 6 6 7 6 7 4 3 3 4 4 5 6 10 10 13 9 9 12 22 53
47 48 57 53 48 69 154 103 87 83 78 46 52 84 89 25 8 9 11 9 11 10 7 7 8 10 12 12 9 18 19 20 17 13 14 10
1 3 5 6 6 5 4 4 4 5 5 4 2 1

Figure 16. SATOB 401 - 700 hPa vector mean wind. JULY 2002
All observations
Arrows are plotted where greater than 10 obs are present

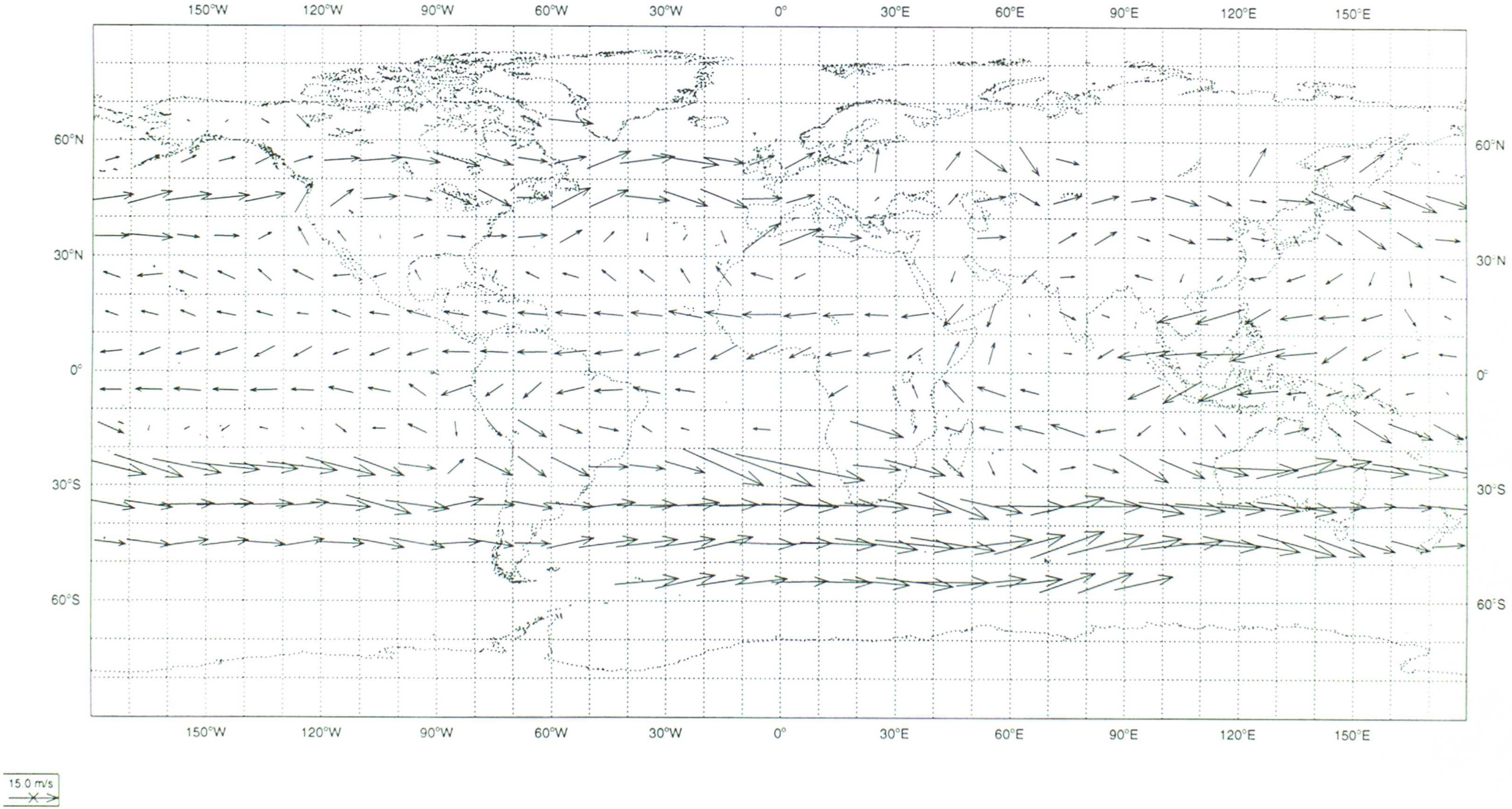

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0 m/s

Figure 17. SATOB 401 - 700 hPa vector wind differences. JULY 2002
All observations
Arrows are plotted where greater than 10 obs are present

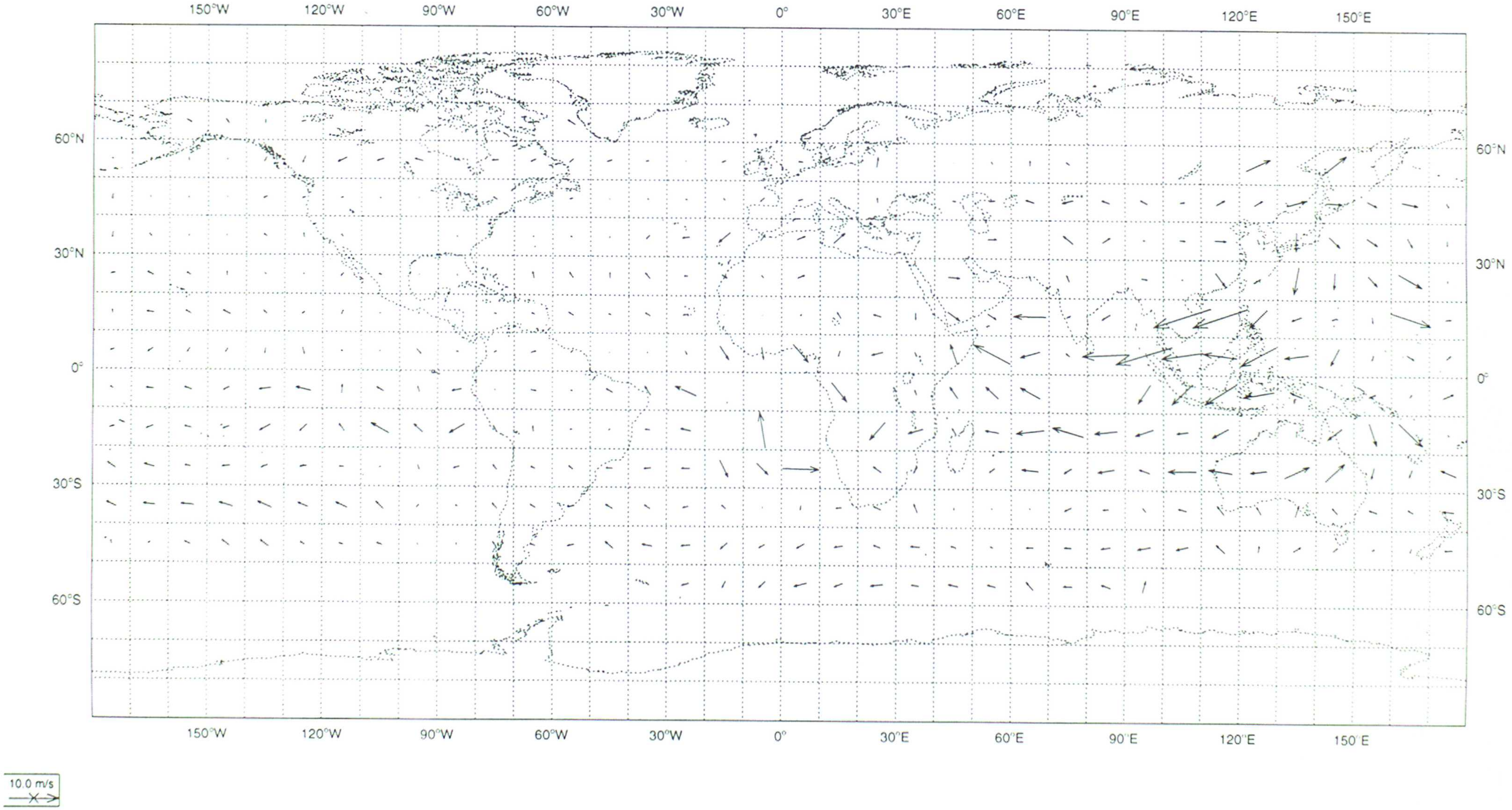

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0 m/s

Figure 18. SATOB 401 - 700 hPa mean O-B speed differences (ms-1). JULY 2002

All observations

Values are plotted where greater than 10 obs are present

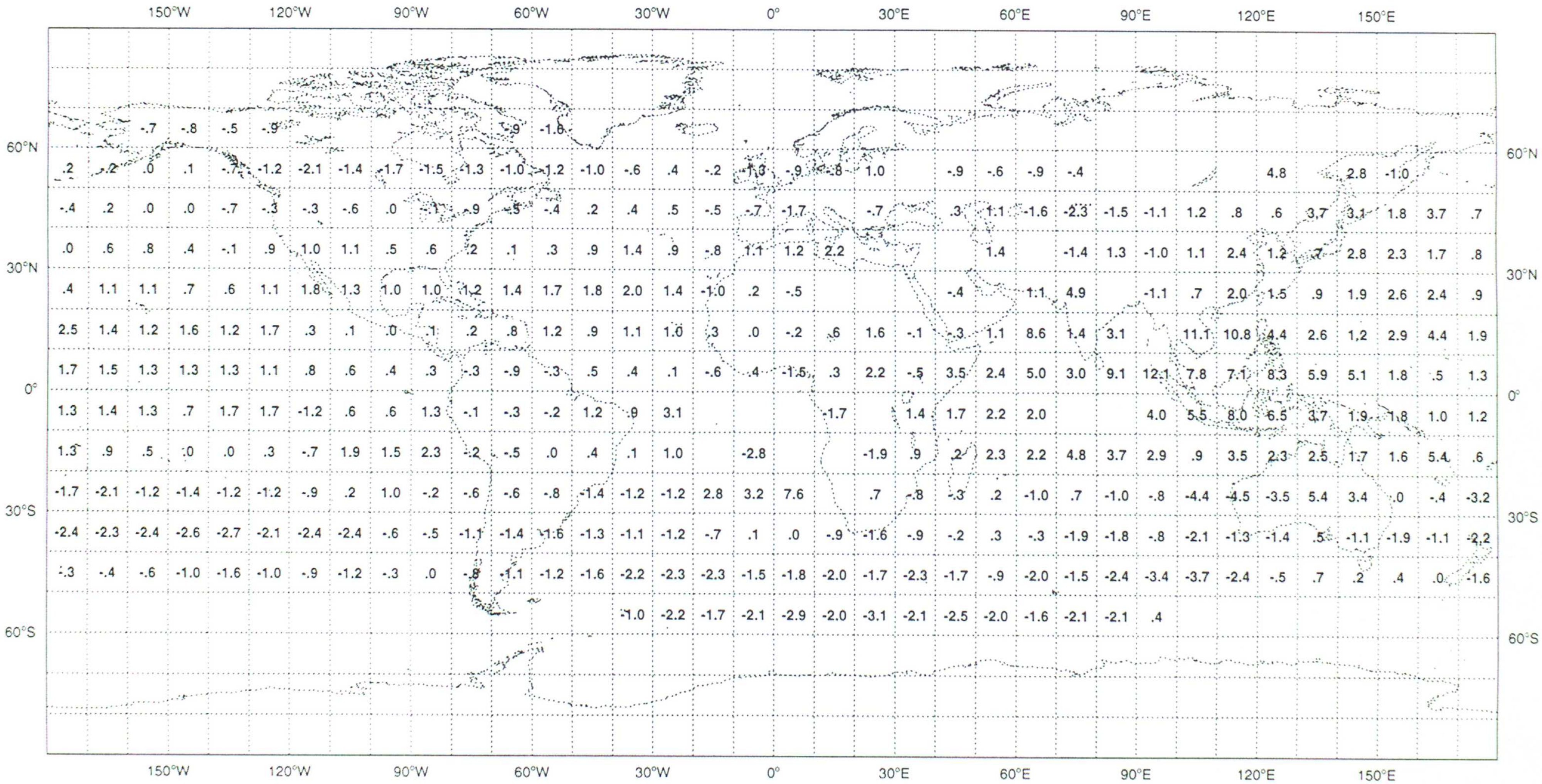

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-.7 -.8 -.5 -.9 -.9 -1.6
.2 .2 .0 .1 -.7 -1.2 -2.1 -1.4 -1.7 -1.5 -1.3 -1.0 -1.2 -1.0 -.6 .4 -.2 -1.3 -.9 -.8 1.0 -.9 -.6 -.9 -.4 4.8 2.8 -1.0
-.4 .2 .0 .0 -.7 -.3 -.3 -.6 .0 -.1 -.9 -.5 -.4 .2 .4 .5 -.5 -.7 -1.7 -.7 .3 1.1 -1.6 -2.3 -1.5 -1.1 1.2 .8 .6 3.7 3.1 1.8 3.7 .7
.0 .6 .8 .4 -.1 .9 1.0 1.1 .5 .6 .2 .1 .3 .9 1.4 .9 -.8 1.1 1.2 2.2 1.4 -1.4 1.3 -1.0 1.1 2.4 1.2 .7 2.8 2.3 1.7 .8
.4 1.1 1.1 .7 .6 1.1 1.8 1.3 1.0 1.0 1.2 1.4 1.7 1.8 2.0 1.4 -1.0 .2 -.5 -.4 1.1 4.9 -1.1 .7 2.0 1.5 .9 1.9 2.6 2.4 .9
2.5 1.4 1.2 1.6 1.2 1.7 .3 .1 .0 .1 .2 .8 1.2 .9 1.1 1.0 .3 .0 -.2 .6 1.6 -.1 -.3 1.1 8.6 1.4 3.1 11.1 10.8 4.4 2.6 1.2 2.9 4.4 1.9
1.7 1.5 1.3 1.3 1.3 1.1 .8 .6 .4 .3 -.3 -.9 -.3 .5 .4 .1 -.6 .4 -1.5 .3 2.2 -.5 3.5 2.4 5.0 3.0 9.1 12.1 7.8 7.1 8.3 5.9 5.1 1.8 .5 1.3
1.3 1.4 1.3 .7 1.7 1.7 -1.2 .6 .6 1.3 -.1 -.3 -.2 1.2 .9 3.1 -1.7 1.4 1.7 2.2 2.0 4.0 5.5 8.0 6.5 3.7 1.9 1.8 1.0 1.2
1.3 .9 .5 .0 .0 .3 -.7 1.9 1.5 2.3 -.2 -.5 .0 .4 .1 1.0 -2.8 -1.9 .9 .2 2.3 2.2 4.8 3.7 2.9 .9 3.5 2.3 2.5 1.7 1.6 5.4 .6
-1.7 -2.1 -1.2 -1.4 -1.2 -1.2 -.9 .2 1.0 -.2 -.6 -.6 -.8 -1.4 -1.2 -1.2 2.8 3.2 7.6 .7 -.8 -.3 .2 -1.0 .7 -1.0 -.8 -4.4 -4.5 -3.5 5.4 3.4 .0 -.4 -3.2
-2.4 -2.3 -2.4 -2.6 -2.7 -2.1 -2.4 -2.4 -.6 -.5 -1.1 -1.4 -1.6 -1.3 -1.1 -1.2 -.7 .1 .0 -.9 -1.6 -.9 -.2 .3 -.3 -1.9 -1.8 -.8 -2.1 -1.3 -1.4 .5 -1.1 -1.9 -1.1 -2.2
-.3 -.4 -.6 -1.0 -1.6 -1.0 -.9 -1.2 -.3 .0 -.8 -1.1 -1.2 -1.6 -2.2 -2.3 -2.3 -1.5 -1.8 -2.0 -1.7 -2.3 -1.7 -.9 -2.0 -1.5 -2.4 -3.4 -3.7 -2.4 -.5 .7 .2 .4 .0 -1.6
-1.0 -2.2 -1.7 -2.1 -2.9 -2.0 -3.1 -2.1 -2.5 -2.0 -1.6 -2.1 -2.1 .4

Figure 19. SATOB 401 - 700 hPa RMS O-B vector differences (ms-1). JULY 2002
All observations
Values are plotted where greater than 10 obs are present

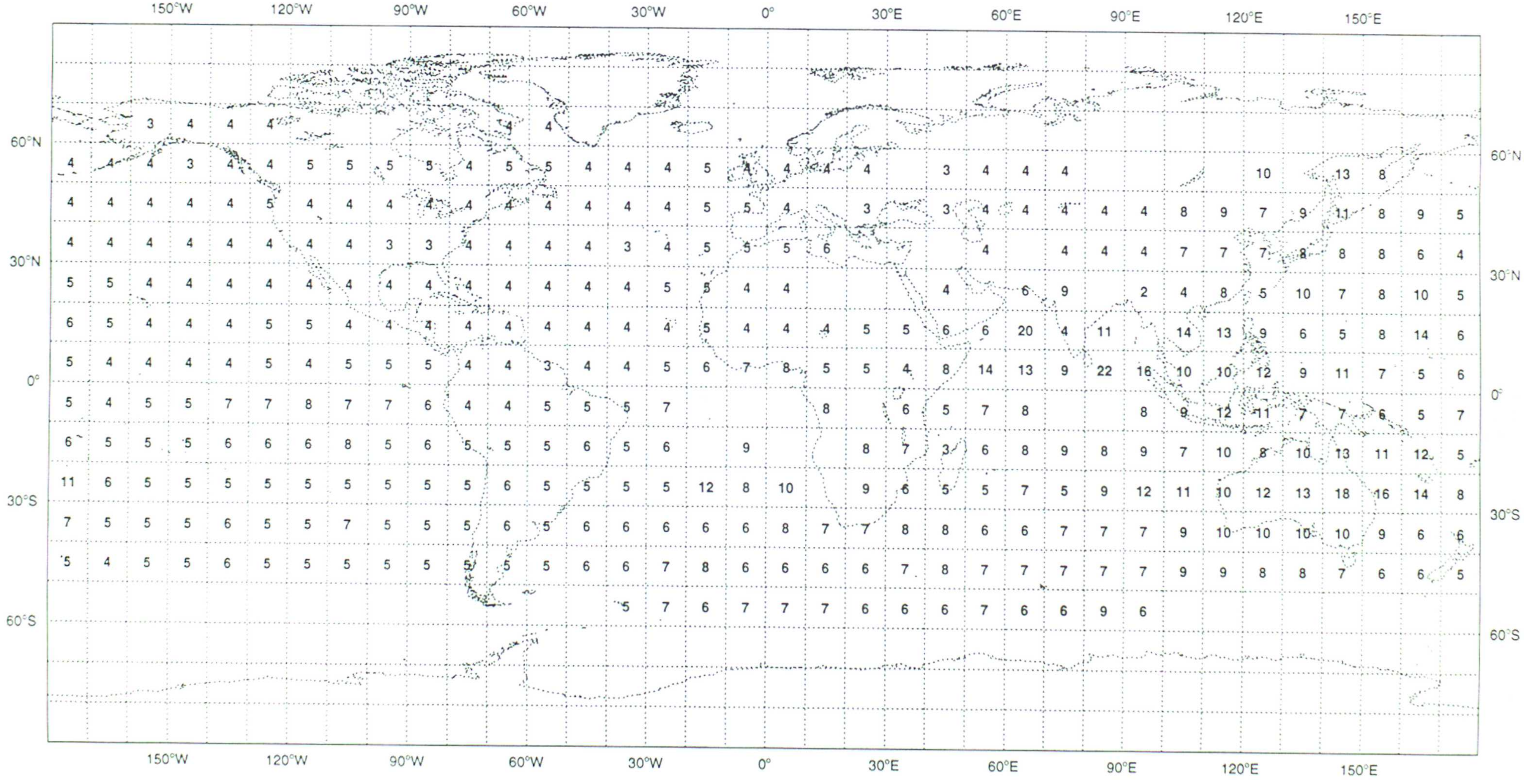
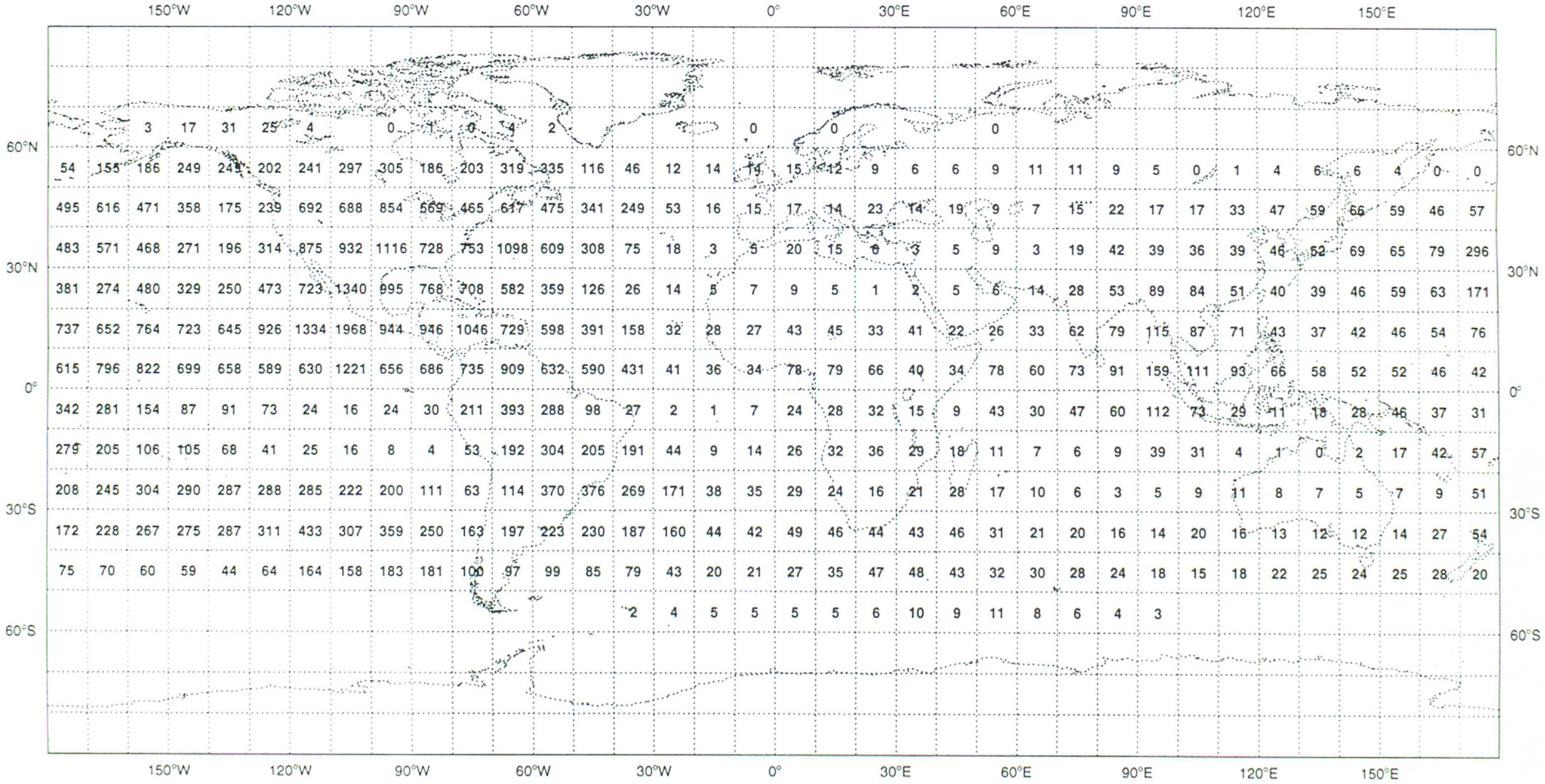

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 20. SATOB 101 - 400 hPa mean daily count. JULY 2002
Global average number of observations in 24 hours = 71272



		3	17	31	25	4		0	1	0	4	2					0		0				0												
54	155	186	249	245	202	241	297	305	186	203	319	335	116	46	12	14	19	15	12	9	6	6	9	11	11	9	5	0	1	4	6	6	4	0	0
495	616	471	358	175	239	692	688	854	569	465	617	475	341	249	53	16	15	17	14	23	14	19	9	7	15	22	17	17	33	47	59	66	59	46	57
483	571	468	271	196	314	875	932	1116	728	753	1098	609	308	75	18	3	5	20	15	6	3	5	9	3	19	42	39	36	39	46	52	69	65	79	296
381	274	480	329	250	473	723	1340	995	768	708	582	359	126	26	14	5	7	9	5	1	2	5	6	14	28	53	89	84	51	40	39	46	59	63	171
737	652	764	723	645	926	1334	1968	944	946	1046	729	598	391	158	32	28	27	43	45	33	41	22	26	33	62	79	115	87	71	43	37	42	46	54	76
615	796	822	699	658	589	630	1221	656	686	735	909	632	590	431	41	36	34	78	79	66	40	34	78	60	73	91	159	111	93	66	58	52	52	46	42
342	281	154	87	91	73	24	16	24	30	211	393	288	98	27	2	1	7	24	28	32	15	9	43	30	47	60	112	73	29	11	18	28	46	37	31
279	205	106	105	68	41	25	16	8	4	53	192	304	205	191	44	9	14	26	32	36	29	18	11	7	6	9	39	31	4	1	0	2	17	42	57
208	245	304	290	287	288	285	222	200	111	63	114	370	376	269	171	38	35	29	24	16	21	28	17	10	6	3	5	9	11	8	7	5	7	9	51
172	228	267	275	287	311	433	307	359	250	163	197	223	230	187	160	44	42	49	46	44	43	46	31	21	20	16	14	20	16	13	12	12	14	27	54
75	70	60	59	44	64	164	158	183	181	100	97	99	85	79	43	20	21	27	35	47	48	43	32	30	28	24	18	15	18	22	25	24	25	28	20
														2	4	5	5	5	5	6	10	9	11	8	6	4	3								

Figure 21. SATOB 101 - 400 hPa vector mean wind. JULY 2002
All observations
Arrows are plotted where greater than 10 obs are present

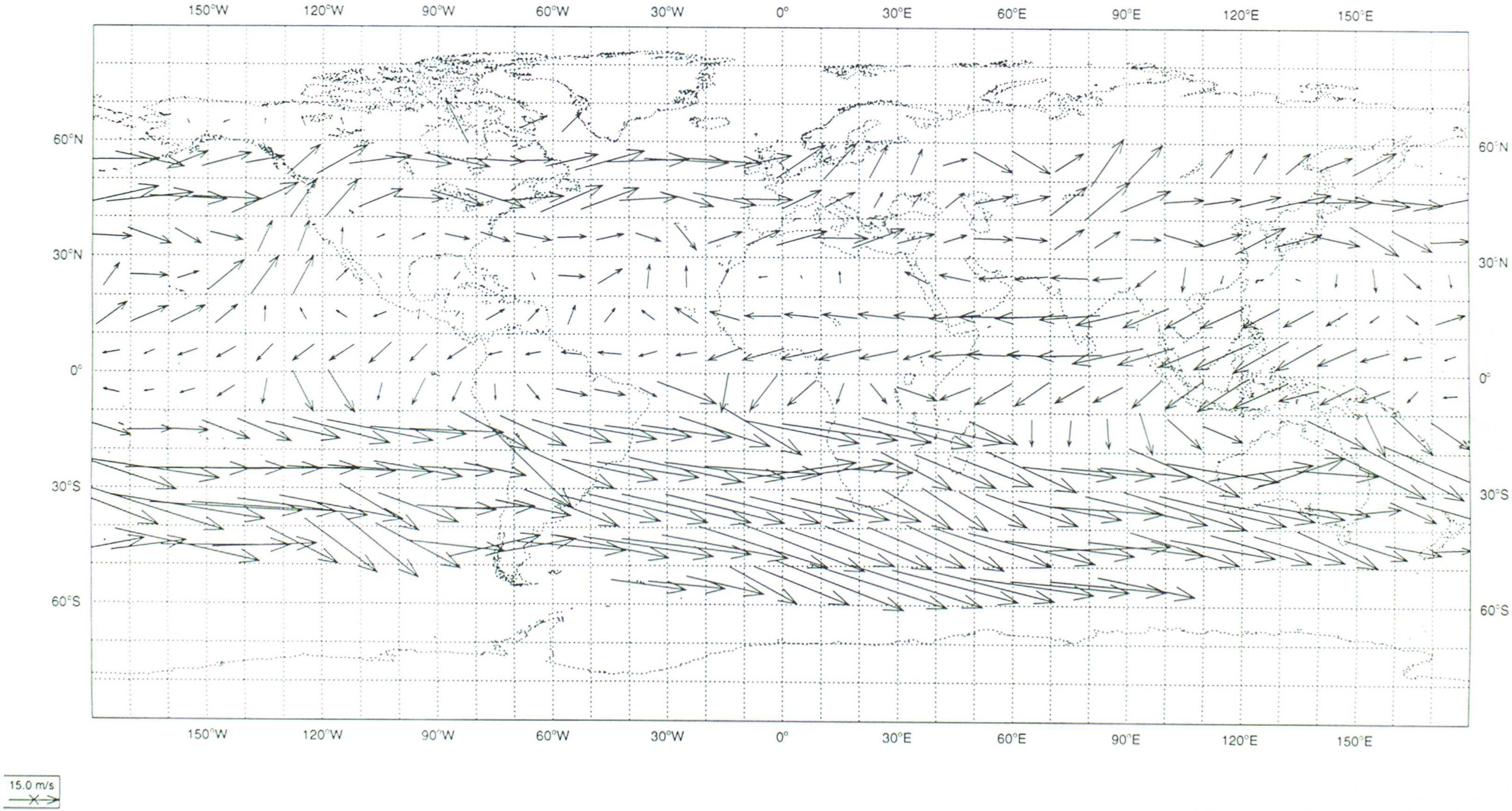

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0 m/s

Figure 22. SATOB 101 - 400 hPa vector wind differences. JULY 2002

All observations

Arrows are plotted where greater than 10 obs are present

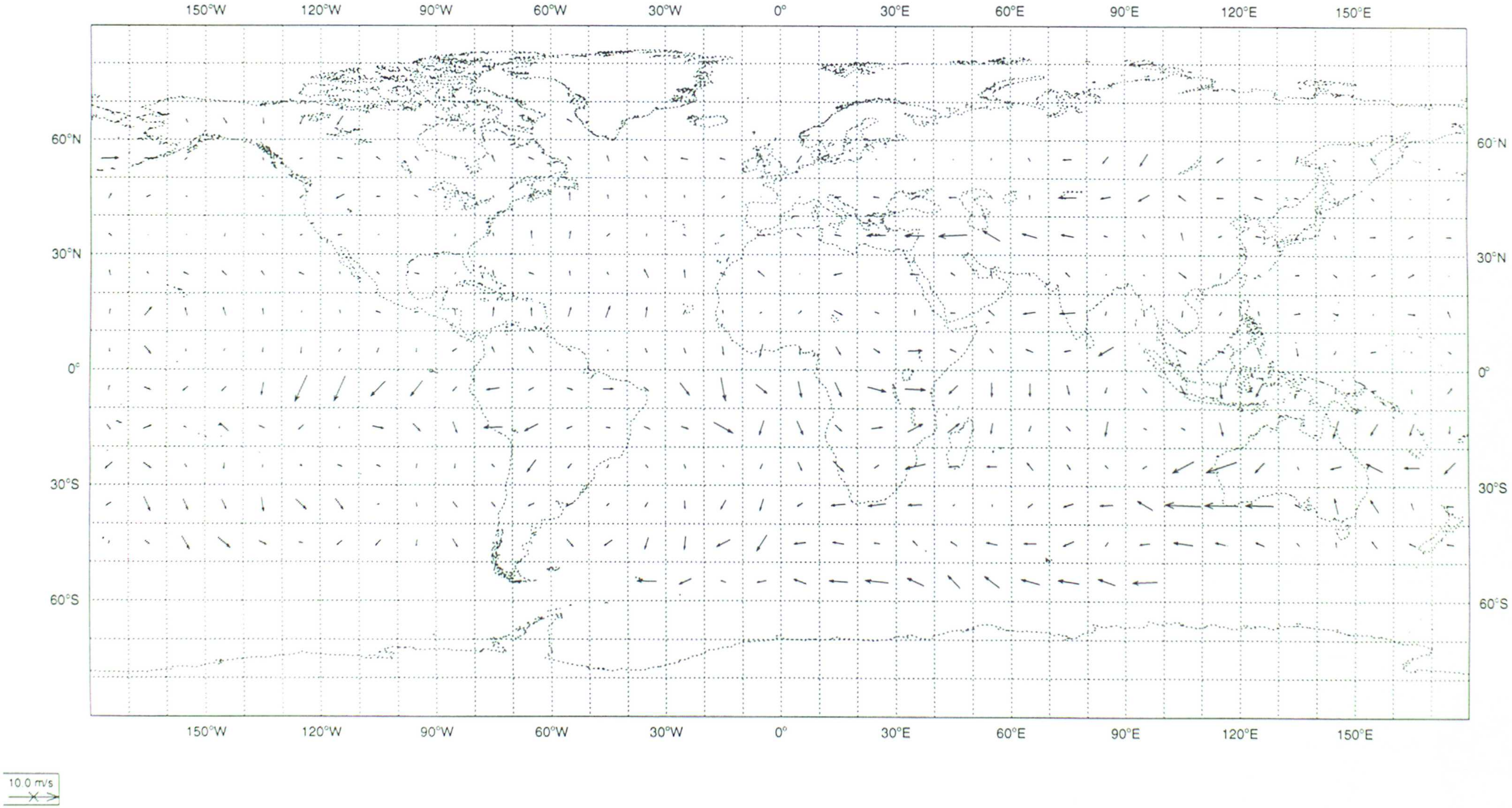

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0 m/s

Figure 23. SATOB 101 - 400 hPa mean O-B speed differences (ms-1). JULY 2002

All observations

Values are plotted where greater than 10 obs are present

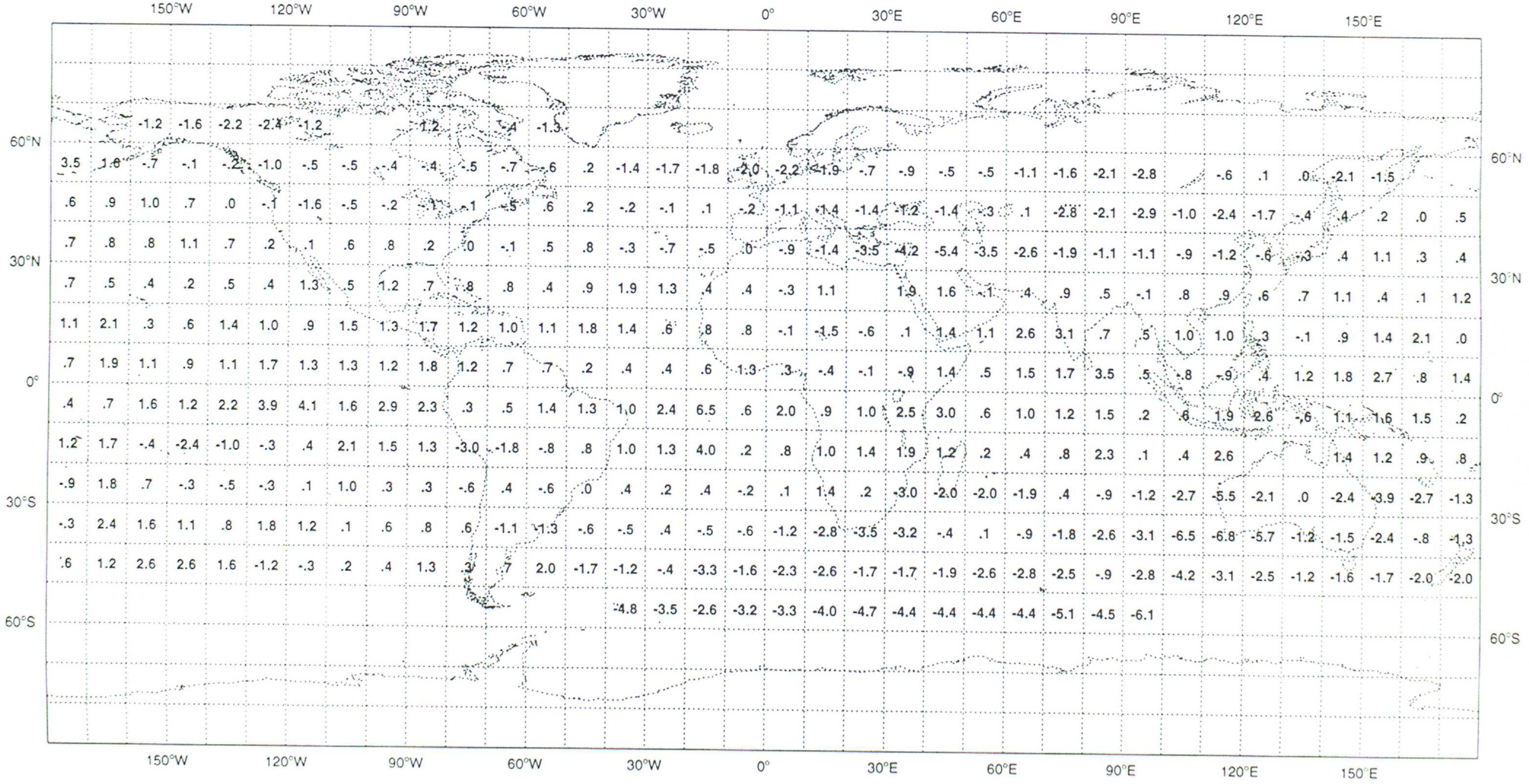
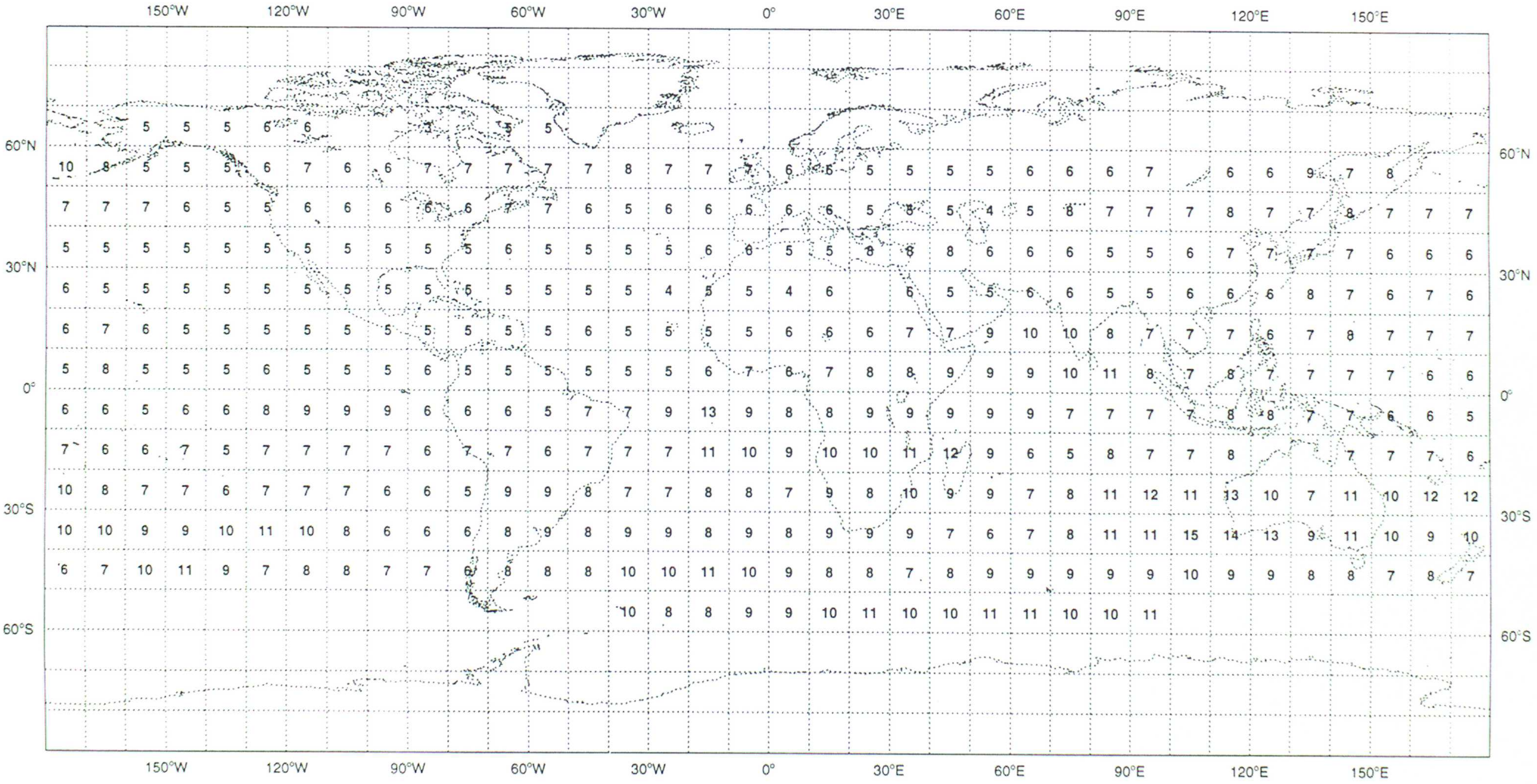

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-1.2 -1.6 -2.2 -2.4 -1.2 -1.2 -.4 -1.3
3.5 1.6 -.7 -.1 -.2 -1.0 -.5 -.5 -.4 -.4 -.5 -.7 -.6 .2 -1.4 -1.7 -1.8 -2.0 -2.2 -1.9 -.7 -.9 -.5 -.5 -1.1 -1.6 -2.1 -2.8 -.6 .1 .0 -2.1 -1.5
.6 .9 1.0 .7 .0 -.1 -1.6 -.5 -.2 -.1 -.1 -.5 .6 .2 -.2 -.1 .1 -.2 -1.1 -1.4 -1.4 -1.2 -1.4 -.3 .1 -2.8 -2.1 -2.9 -1.0 -2.4 -1.7 -.4 .4 .2 .0 .5
.7 .8 .8 1.1 .7 .2 .1 .6 .8 .2 .0 -.1 .5 .8 -.3 -.7 -.5 .0 -.9 -1.4 -3.5 -4.2 -5.4 -3.5 -2.6 -1.9 -1.1 -1.1 -.9 -1.2 -.6 -.3 .4 1.1 .3 .4
.7 .5 .4 .2 .5 .4 1.3 .5 1.2 .7 .8 .8 .4 .9 1.9 1.3 .4 .4 -.3 1.1 1.9 1.6 -.1 .4 .9 .5 -.1 .8 .9 .6 .7 1.1 .4 .1 1.2
1.1 2.1 .3 .6 1.4 1.0 .9 1.5 1.3 1.7 1.2 1.0 1.1 1.8 1.4 .6 .8 .8 -.1 -1.5 -.6 .1 1.4 1.1 2.6 3.1 .7 .5 1.0 1.0 .3 -.1 .9 1.4 2.1 .0
.7 1.9 1.1 .9 1.1 1.7 1.3 1.3 1.2 1.8 1.2 .7 .7 .2 .4 .4 .6 1.3 .3 -.4 -.1 -.9 1.4 .5 1.5 1.7 3.5 .5 .8 -.9 .4 1.2 1.8 2.7 .8 1.4
.4 .7 1.6 1.2 2.2 3.9 4.1 1.6 2.9 2.3 .3 .5 1.4 1.3 1.0 2.4 6.5 .6 2.0 .9 1.0 2.5 3.0 .6 1.0 1.2 1.5 .2 .6 1.9 2.6 .6 1.1 1.6 1.5 .2
1.2 1.7 -.4 -2.4 -1.0 -.3 .4 2.1 1.5 1.3 -3.0 -1.8 -.8 .8 1.0 1.3 4.0 .2 .8 1.0 1.4 1.9 1.2 .2 .4 .8 2.3 .1 .4 2.6 1.4 1.2 .9 .8
-.9 1.8 .7 -.3 -.5 -.3 .1 1.0 .3 .3 -.6 .4 -.6 .0 .4 .2 .4 -.2 .1 1.4 .2 -3.0 -2.0 -2.0 -1.9 .4 -.9 -1.2 -2.7 -5.5 -2.1 .0 -2.4 -3.9 -2.7 -1.3
-.3 2.4 1.6 1.1 .8 1.8 1.2 .1 .6 .8 .6 -1.1 -1.3 -.6 -.5 .4 -.5 -.6 -1.2 -2.8 -3.5 -3.2 -.4 .1 -.9 -1.8 -2.6 -3.1 -6.5 -6.8 -5.7 -1.2 -1.5 -2.4 -.8 -1.3
.6 1.2 2.6 2.6 1.6 -1.2 -.3 .2 .4 1.3 .3 .7 2.0 -1.7 -1.2 -.4 -3.3 -1.6 -2.3 -2.6 -1.7 -1.7 -1.9 -2.6 -2.8 -2.5 -.9 -2.8 -4.2 -3.1 -2.5 -1.2 -1.6 -1.7 -2.0 -2.0
-4.8 -3.5 -2.6 -3.2 -3.3 -4.0 -4.7 -4.4 -4.4 -4.4 -4.4 -5.1 -4.5 -6.1

Figure 24. SATOB 101 - 400 hPa RMS O-B vector differences (ms-1). JULY 2002

All observations

Values are plotted where greater than 10 obs are present


150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
5 5 5 6 6 3 5 5
10 8 5 5 5 6 7 6 6 7 7 7 7 7 8 7 7 7 6 5 5 5 5 5 6 6 6 7 6 6 9 7 8
7 7 7 6 5 5 6 6 6 6 6 7 7 6 5 6 6 6 6 6 5 8 5 4 5 8 7 7 7 8 7 7 8 7 7 7
5 5 5 5 5 5 5 5 5 5 5 6 5 5 5 5 6 6 5 5 8 8 8 6 6 6 5 5 6 7 7 7 7 6 6 6
6 5 5 5 5 5 5 5 5 5 6 5 5 5 5 4 5 5 4 6 6 5 5 6 6 5 5 6 6 6 8 7 6 7 6
6 7 6 5 5 5 5 5 5 5 5 5 5 6 5 5 5 5 6 6 6 7 7 9 10 10 8 7 7 7 6 7 8 7 7 7
5 8 5 5 5 6 5 5 5 6 5 5 5 5 5 5 6 7 6 7 8 8 9 9 9 10 11 8 7 8 7 7 7 7 6 6
6 6 5 6 6 8 9 9 9 6 6 6 5 7 7 9 13 9 8 8 9 9 9 9 9 7 7 7 7 8 8 7 7 6 6 5
7 6 6 7 5 7 7 7 7 6 7 7 6 7 7 7 11 10 9 10 10 11 12 9 6 5 8 7 7 8 7 7 7 6
10 8 7 7 6 7 7 7 6 6 5 9 9 8 7 7 8 8 7 9 8 10 9 9 7 8 11 12 11 13 10 7 11 10 12 12
10 10 9 9 10 11 10 8 6 6 6 8 9 8 9 9 8 9 8 9 9 9 7 6 7 8 11 11 15 14 13 9 11 10 9 10
6 7 10 11 9 7 8 8 7 7 6 8 8 8 10 10 11 10 9 8 8 7 8 9 9 9 9 9 10 9 9 8 8 7 8 7
10 8 8 9 9 10 11 10 10 11 11 10 10 11

MONITORING OF SATELLITE TEMPERATURES

MONITORING CENTRE: BRACKNELL

MONTH: July 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from NOAA-15 and NOAA-16.

Standard of comparison :Background field from UKMO global model.

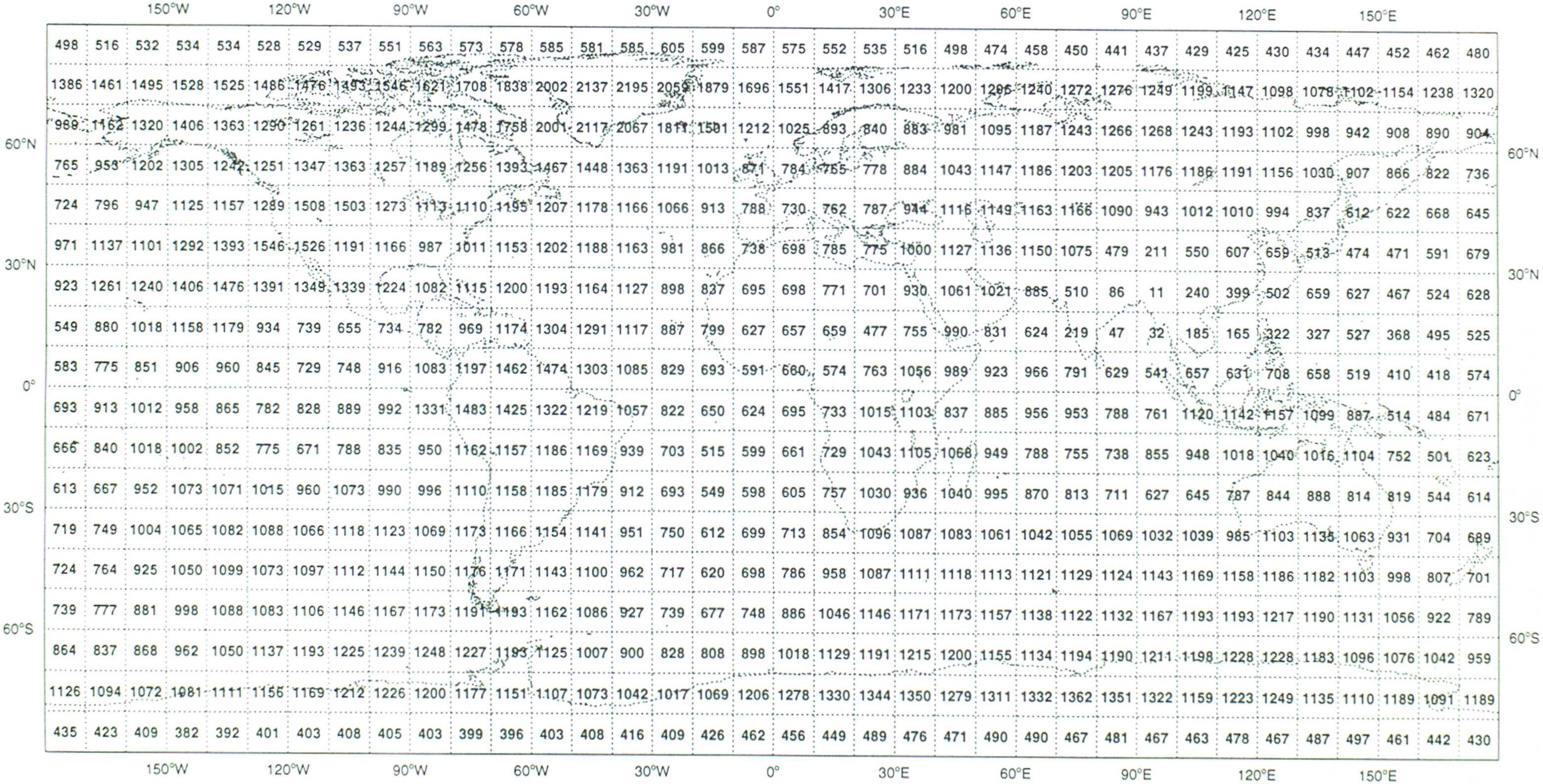
Selection Criteria :All soundings.

Data Extracted :Sounding channels (and approximate weighting function peaks, hPa)

HIRS8 (Surface)
HIRS15 (700)
HIRS11 (500-700)
HIRS4 (400)
AMSUA5 (700)
AMSUA7 (300)
AMSUA9 (100)

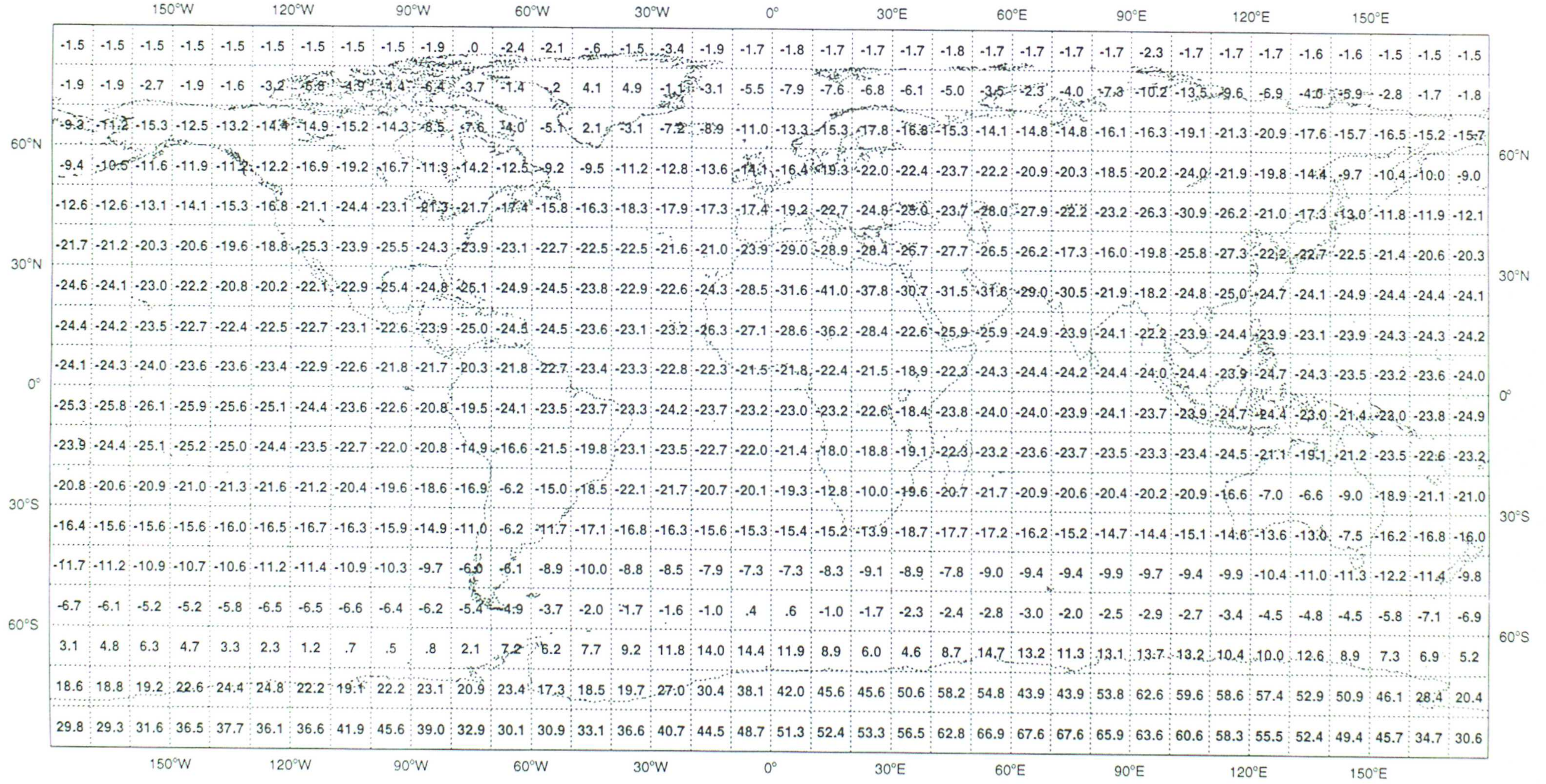
:Mean and standard deviation observation-minus-background brightness temperature differences

Figure 25. ATOVS mean daily count. JULY 2002
NOAA15, using all observations
Global average number of observations in 24 hours = 616889



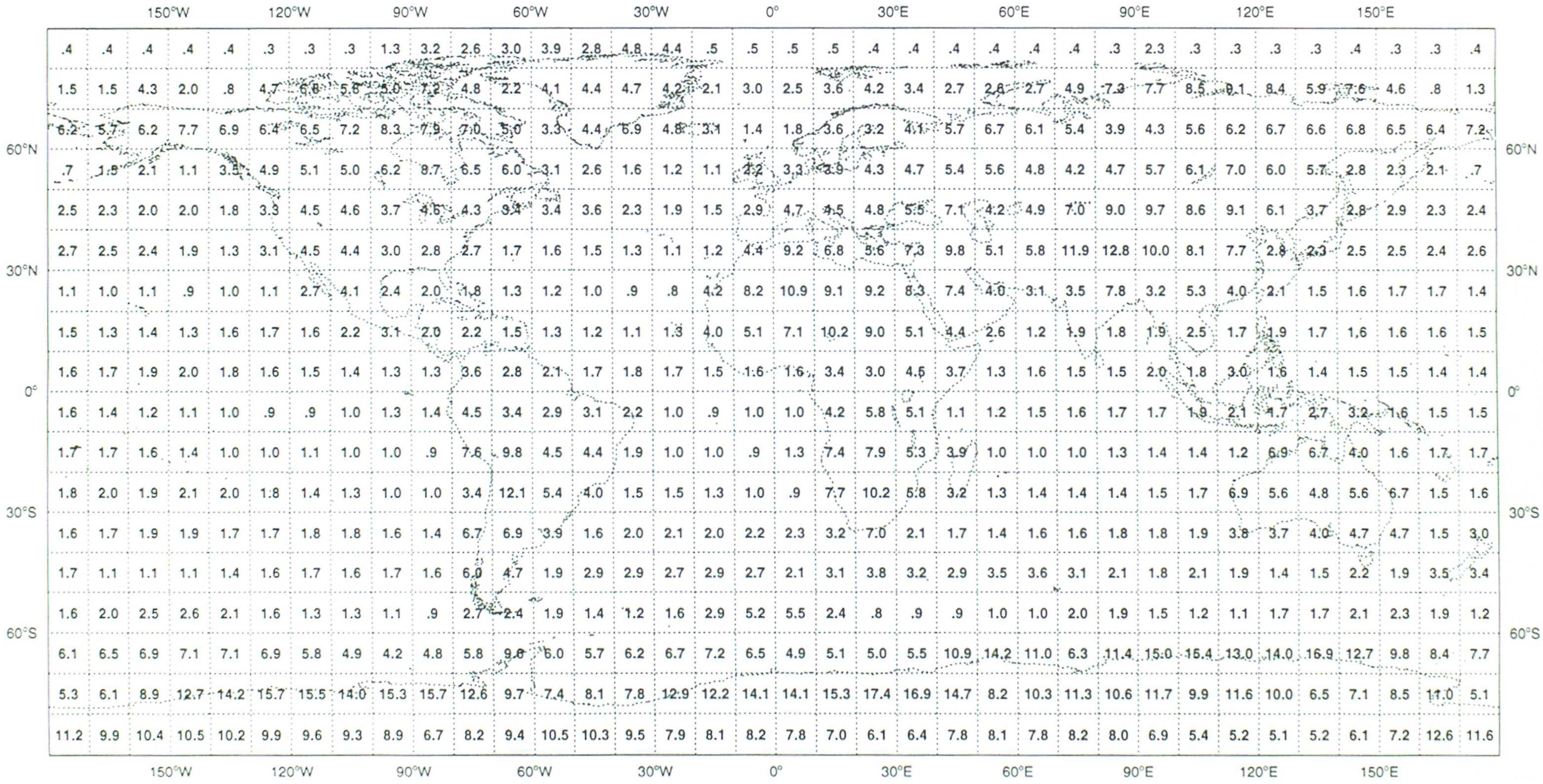
498	516	532	534	534	528	529	537	551	563	573	578	585	581	585	605	599	587	575	552	535	516	498	474	458	450	441	437	429	425	430	434	447	452	462	480
1386	1461	1495	1528	1525	1486	1476	1493	1546	1621	1708	1838	2002	2137	2195	2059	1879	1696	1551	1417	1306	1233	1200	1296	1240	1272	1276	1249	1199	1147	1098	1078	1102	1154	1238	1320
989	1162	1320	1406	1363	1290	1261	1236	1244	1299	1478	1758	2001	2117	2067	1811	1501	1212	1025	893	840	883	981	1095	1187	1243	1266	1268	1243	1193	1102	998	942	908	890	904
765	953	1202	1305	1242	1251	1347	1363	1257	1189	1256	1393	1467	1448	1363	1191	1013	871	784	755	778	884	1043	1147	1186	1203	1205	1176	1186	1191	1156	1030	907	866	822	736
724	796	947	1125	1157	1289	1508	1503	1273	1113	1110	1195	1207	1178	1166	1066	913	788	730	762	787	944	1116	1149	1163	1166	1090	943	1012	1010	994	837	612	622	668	645
971	1137	1101	1292	1393	1546	1526	1191	1166	987	1011	1153	1202	1188	1163	981	866	738	698	785	775	1000	1127	1136	1150	1075	479	211	550	607	659	513	474	471	591	679
923	1261	1240	1406	1476	1391	1349	1339	1224	1082	1115	1200	1193	1164	1127	898	837	695	698	771	701	930	1061	1021	885	510	86	11	240	399	502	659	627	467	524	628
549	880	1018	1158	1179	934	739	655	734	782	969	1174	1304	1291	1117	887	799	627	657	659	477	755	990	831	624	219	47	32	185	165	322	327	527	368	495	525
583	775	851	906	960	845	729	748	916	1083	1197	1462	1474	1303	1085	829	693	591	660	574	763	1056	989	923	966	791	629	541	657	631	708	658	519	410	418	574
693	913	1012	958	865	782	828	889	992	1331	1483	1425	1322	1219	1057	822	650	624	695	733	1015	1103	837	885	956	953	788	761	1120	1142	1157	1099	887	514	484	671
666	840	1018	1002	852	775	671	788	835	950	1162	1157	1186	1169	939	703	515	599	661	729	1043	1105	1068	949	788	755	738	855	948	1018	1040	1016	1104	752	501	623
613	667	952	1073	1071	1015	960	1073	990	996	1110	1158	1185	1179	912	693	549	598	605	757	1030	936	1040	995	870	813	711	627	645	787	844	888	814	819	544	614
719	749	1004	1065	1082	1088	1066	1118	1123	1069	1173	1166	1154	1141	951	750	612	699	713	854	1096	1087	1083	1061	1042	1055	1069	1032	1039	985	1103	1135	1063	931	704	689
724	764	925	1050	1099	1073	1097	1112	1144	1150	1176	1171	1143	1100	962	717	620	698	786	958	1087	1111	1118	1113	1121	1129	1124	1143	1169	1158	1186	1182	1103	998	807	701
739	777	881	998	1088	1083	1106	1146	1167	1173	1191	1193	1162	1086	927	739	677	748	886	1046	1146	1171	1173	1157	1138	1122	1132	1167	1193	1193	1217	1190	1131	1056	922	789
864	837	868	962	1050	1137	1193	1225	1239	1248	1227	1193	1125	1007	900	828	808	898	1018	1129	1191	1215	1200	1155	1134	1194	1190	1211	1198	1228	1228	1183	1096	1076	1042	959
1126	1094	1072	1081	1111	1156	1169	1212	1226	1200	1177	1151	1107	1073	1042	1017	1069	1206	1278	1330	1344	1350	1279	1311	1332	1362	1351	1322	1159	1223	1249	1135	1110	1189	1091	1189
435	423	409	382	392	401	403	408	405	403	399	396	403	408	416	409	426	462	456	449	489	476	471	490	490	467	481	467	463	478	467	487	497	461	442	430

Figure 26. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2002
Channel: HIRS8 (Surface)
NOAA15, using all observations



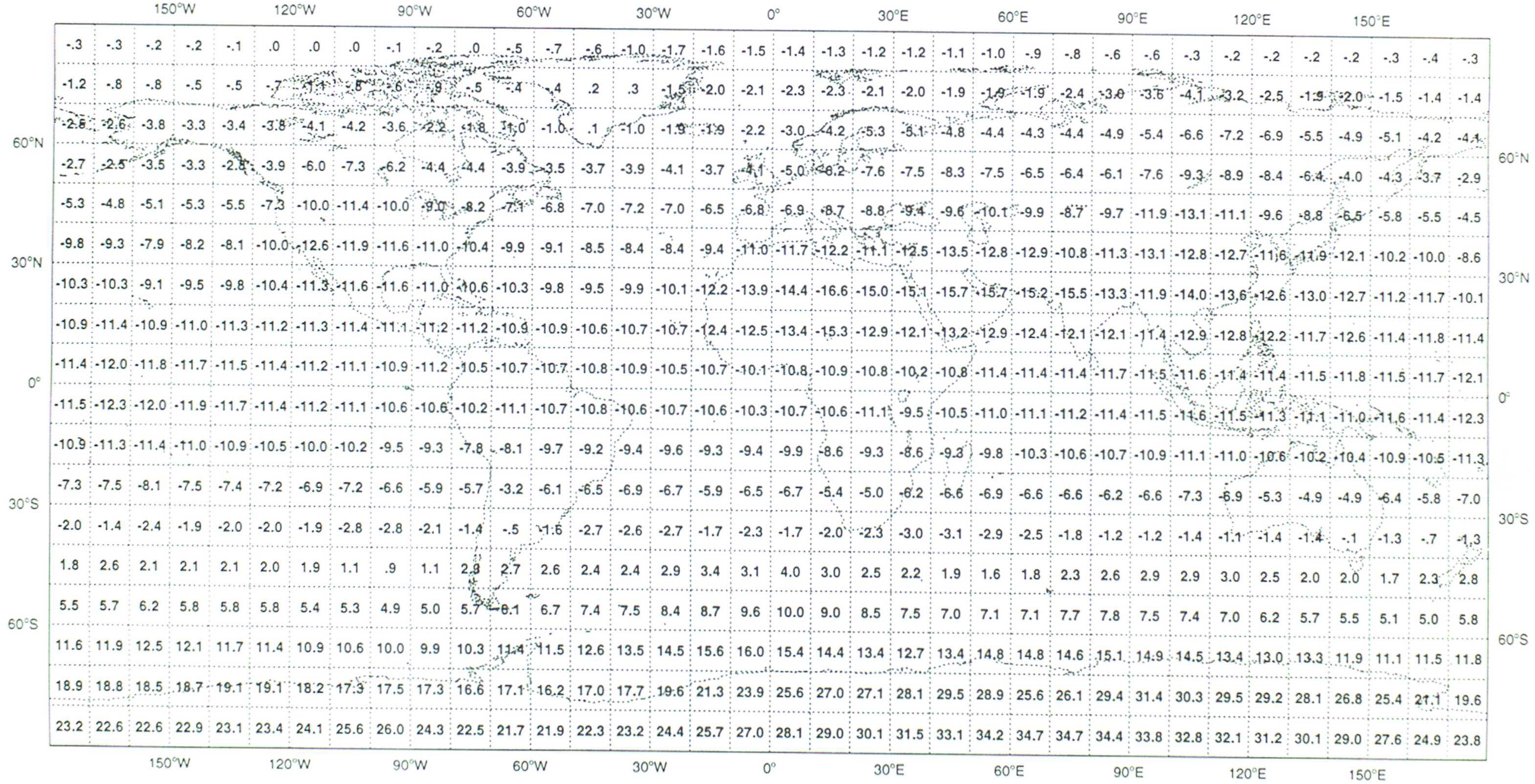
-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.9	.0	-2.4	-2.1	-.6	-1.5	-3.4	-1.9	-1.7	-1.8	-1.7	-1.7	-1.7	-1.8	-1.7	-1.7	-1.7	-1.7	-2.3	-1.7	-1.7	-1.7	-1.6	-1.6	-1.5	-1.5	-1.5
-1.9	-1.9	-2.7	-1.9	-1.6	-3.2	-5.8	-4.9	-4.4	-6.4	-3.7	-1.4	-.2	4.1	4.9	-1.1	-3.1	-5.5	-7.9	-7.6	-6.8	-6.1	-5.0	-3.5	-2.3	-4.0	-7.3	-10.2	-13.5	-9.6	-6.9	-4.0	-5.9	-2.8	-1.7	-1.8
-9.3	-11.2	-15.3	-12.5	-13.2	-14.4	-14.9	-15.2	-14.3	-8.5	-7.6	14.0	-5.1	2.1	-3.1	-7.2	-8.9	-11.0	-13.3	-15.3	-17.8	-16.8	-15.3	-14.1	-14.8	-14.8	-16.1	-16.3	-19.1	-21.3	-20.9	-17.6	-15.7	-16.5	-15.2	-15.7
-9.4	-10.5	-11.6	-11.9	-11.2	-12.2	-16.9	-19.2	-16.7	-11.3	-14.2	-12.5	-9.2	-9.5	-11.2	-12.8	-13.6	-14.1	-16.4	-19.3	-22.0	-22.4	-23.7	-22.2	-20.9	-20.3	-18.5	-20.2	-24.0	-21.9	-19.8	-14.4	-9.7	-10.4	-10.0	-9.0
-12.6	-12.6	-13.1	-14.1	-15.3	-16.8	-21.1	-24.4	-23.1	-21.3	-21.7	-17.4	-15.8	-16.3	-18.3	-17.9	-17.3	-17.4	-19.2	-22.7	-24.8	-25.0	-23.7	-28.0	-27.9	-22.2	-23.2	-26.3	-30.9	-26.2	-21.0	-17.3	-13.0	-11.8	-11.9	-12.1
-21.7	-21.2	-20.3	-20.6	-19.6	-18.8	-25.3	-23.9	-25.5	-24.3	-23.9	-23.1	-22.7	-22.5	-22.5	-21.6	-21.0	-23.9	-29.0	-28.9	-28.4	-26.7	-27.7	-26.5	-26.2	-17.3	-16.0	-19.8	-25.8	-27.3	-22.2	-22.7	-22.5	-21.4	-20.6	-20.3
-24.6	-24.1	-23.0	-22.2	-20.8	-20.2	-22.1	-22.9	-25.4	-24.8	-26.1	-24.9	-24.5	-23.8	-22.9	-22.6	-24.3	-28.5	-31.6	-41.0	-37.8	-30.7	-31.5	-31.6	-29.0	-30.5	-21.9	-18.2	-24.8	-25.0	-24.7	-24.1	-24.9	-24.4	-24.4	-24.1
-24.4	-24.2	-23.5	-22.7	-22.4	-22.5	-22.7	-23.1	-22.6	-23.9	-25.0	-24.5	-24.5	-23.6	-23.1	-23.2	-26.3	-27.1	-28.6	-36.2	-28.4	-22.6	-25.9	-25.9	-24.9	-23.9	-24.1	-22.2	-23.9	-24.4	-23.9	-23.1	-23.9	-24.3	-24.3	-24.2
-24.1	-24.3	-24.0	-23.6	-23.6	-23.4	-22.9	-22.6	-21.8	-21.7	-20.3	-21.8	-22.7	-23.4	-23.3	-22.8	-22.3	-21.5	-21.8	-22.4	-21.5	-18.9	-22.3	-24.3	-24.4	-24.2	-24.4	-24.0	-24.4	-23.9	-24.7	-24.3	-23.5	-23.2	-23.6	-24.0
-25.3	-25.8	-26.1	-25.9	-25.6	-25.1	-24.4	-23.6	-22.6	-20.8	-19.5	-24.1	-23.5	-23.7	-23.3	-24.2	-23.7	-23.2	-23.0	-23.2	-22.6	-18.4	-23.8	-24.0	-24.0	-23.9	-24.1	-23.7	-23.9	-24.7	-24.4	-23.0	-21.4	-23.0	-23.8	-24.9
-23.9	-24.4	-25.1	-25.2	-25.0	-24.4	-23.5	-22.7	-22.0	-20.8	-14.9	-16.6	-21.5	-19.8	-23.1	-23.5	-22.7	-22.0	-21.4	-18.0	-18.8	-19.1	-22.3	-23.2	-23.6	-23.7	-23.5	-23.3	-23.4	-24.5	-21.1	-19.1	-21.2	-23.5	-22.6	-23.2
-20.8	-20.6	-20.9	-21.0	-21.3	-21.6	-21.2	-20.4	-19.6	-18.6	-16.9	-6.2	-15.0	-18.5	-22.1	-21.7	-20.7	-20.1	-19.3	-12.8	-10.0	-19.6	-20.7	-21.7	-20.9	-20.6	-20.4	-20.2	-20.9	-16.6	-7.0	-6.6	-9.0	-18.9	-21.1	-21.0
-16.4	-15.6	-15.6	-15.6	-16.0	-16.5	-16.7	-16.3	-15.9	-14.9	-11.0	-6.2	-11.7	-17.1	-16.8	-16.3	-15.6	-15.3	-15.4	-15.2	-13.9	-18.7	-17.7	-17.2	-16.2	-15.2	-14.7	-14.4	-15.1	-14.6	-13.6	-13.0	-7.5	-16.2	-16.8	-16.0
-11.7	-11.2	-10.9	-10.7	-10.6	-11.2	-11.4	-10.9	-10.3	-9.7	-6.0	-6.1	-8.9	-10.0	-8.8	-8.5	-7.9	-7.3	-7.3	-8.3	-9.1	-8.9	-7.8	-9.0	-9.4	-9.4	-9.9	-9.7	-9.4	-9.9	-10.4	-11.0	-11.3	-12.2	-11.4	-9.8
-6.7	-6.1	-5.2	-5.2	-5.8	-6.5	-6.5	-6.6	-6.4	-6.2	-5.4	-4.9	-3.7	-2.0	-1.7	-1.6	-1.0	.4	.6	-1.0	-1.7	-2.3	-2.4	-2.8	-3.0	-2.0	-2.5	-2.9	-2.7	-3.4	-4.5	-4.8	-4.5	-5.8	-7.1	-6.9
3.1	4.8	6.3	4.7	3.3	2.3	1.2	.7	.5	.8	2.1	7.2	6.2	7.7	9.2	11.8	14.0	14.4	11.9	8.9	6.0	4.6	8.7	14.7	13.2	11.3	13.1	13.7	13.2	10.4	10.0	12.6	8.9	7.3	6.9	5.2
18.6	18.8	19.2	22.6	24.4	24.8	22.2	19.1	22.2	23.1	20.9	23.4	17.3	18.5	19.7	27.0	30.4	38.1	42.0	45.6	45.6	50.6	58.2	54.8	43.9	43.9	53.8	62.6	59.6	58.6	57.4	52.9	50.9	46.1	28.4	20.4
29.8	29.3	31.6	36.5	37.7	36.1	36.6	41.9	45.6	39.0	32.9	30.1	30.9	33.1	36.6	40.7	44.5	48.7	51.3	52.4	53.3	56.5	62.8	66.9	67.6	67.6	65.9	63.6	60.6	58.3	55.5	52.4	49.4	45.7	34.7	30.6

Figure 27. ATOVS SD O-B brightness temperature differences (deg C). JULY 2002
Channel: HIRS8 (Surface)
NOAA15, using all observations



.4	.4	.4	.4	.4	.3	.3	.3	1.3	3.2	2.6	3.0	3.9	2.8	4.8	4.4	.5	.5	.5	.5	.4	.4	.4	.4	.4	.4	.3	2.3	.3	.3	.3	.3	.4	.3	.3	.4
1.5	1.5	4.3	2.0	.8	4.7	6.8	5.8	5.0	7.2	4.8	2.2	4.1	4.4	4.7	4.2	2.1	3.0	2.5	3.6	4.2	3.4	2.7	2.8	2.7	4.9	7.3	7.7	8.5	9.1	8.4	5.9	7.6	4.6	.8	1.3
6.2	5.7	6.2	7.7	6.9	6.4	6.5	7.2	8.3	7.9	7.0	5.0	3.3	4.4	6.9	4.8	3.1	1.4	1.8	3.6	3.2	4.1	5.7	6.7	6.1	5.4	3.9	4.3	5.6	6.2	6.7	6.6	6.8	6.5	6.4	7.2
.7	1.5	2.1	1.1	3.5	4.9	5.1	5.0	6.2	8.7	6.5	6.0	3.1	2.6	1.6	1.2	1.1	2.2	3.3	3.9	4.3	4.7	5.4	5.6	4.8	4.2	4.7	5.7	6.1	7.0	6.0	5.7	2.8	2.3	2.1	.7
2.5	2.3	2.0	2.0	1.8	3.3	4.5	4.6	3.7	4.6	4.3	3.4	3.4	3.6	2.3	1.9	1.5	2.9	4.7	4.5	4.8	5.5	7.1	4.2	4.9	7.0	9.0	9.7	8.6	9.1	6.1	3.7	2.8	2.9	2.3	2.4
2.7	2.5	2.4	1.9	1.3	3.1	4.5	4.4	3.0	2.8	2.7	1.7	1.6	1.5	1.3	1.1	1.2	4.4	9.2	6.8	5.6	7.3	9.8	5.1	5.8	11.9	12.8	10.0	8.1	7.7	2.8	2.3	2.5	2.5	2.4	2.6
1.1	1.0	1.1	.9	1.0	1.1	2.7	4.1	2.4	2.0	1.8	1.3	1.2	1.0	.9	.8	4.2	8.2	10.9	9.1	9.2	8.3	7.4	4.0	3.1	3.5	7.8	3.2	5.3	4.0	2.1	1.5	1.6	1.7	1.7	1.4
1.5	1.3	1.4	1.3	1.6	1.7	1.6	2.2	3.1	2.0	2.2	1.5	1.3	1.2	1.1	1.3	4.0	5.1	7.1	10.2	9.0	5.1	4.4	2.6	1.2	1.9	1.8	1.9	2.5	1.7	1.9	1.7	1.6	1.6	1.6	1.5
1.6	1.7	1.9	2.0	1.8	1.6	1.5	1.4	1.3	1.3	3.6	2.8	2.1	1.7	1.8	1.7	1.5	1.6	1.6	3.4	3.0	4.5	3.7	1.3	1.6	1.5	1.5	2.0	1.8	3.0	1.6	1.4	1.5	1.5	1.4	1.4
1.6	1.4	1.2	1.1	1.0	.9	.9	1.0	1.3	1.4	4.5	3.4	2.9	3.1	2.2	1.0	.9	1.0	1.0	4.2	5.8	5.1	1.1	1.2	1.5	1.6	1.7	1.7	1.9	2.1	1.7	2.7	3.2	1.6	1.5	1.5
1.7	1.7	1.6	1.4	1.0	1.0	1.1	1.0	1.0	.9	7.6	9.8	4.5	4.4	1.9	1.0	1.0	.9	1.3	7.4	7.9	5.3	3.9	1.0	1.0	1.0	1.3	1.4	1.4	1.2	6.9	6.7	4.0	1.6	1.7	1.7
1.8	2.0	1.9	2.1	2.0	1.8	1.4	1.3	1.0	1.0	3.4	12.1	5.4	4.0	1.5	1.5	1.3	1.0	.9	7.7	10.2	5.8	3.2	1.3	1.4	1.4	1.4	1.5	1.7	6.9	5.6	4.8	5.6	6.7	1.5	1.6
1.6	1.7	1.9	1.9	1.7	1.7	1.8	1.8	1.6	1.4	6.7	6.9	3.9	1.6	2.0	2.1	2.0	2.2	2.3	3.2	7.0	2.1	1.7	1.4	1.6	1.6	1.8	1.8	1.9	3.8	3.7	4.0	4.7	4.7	1.5	3.0
1.7	1.1	1.1	1.1	1.4	1.6	1.7	1.6	1.7	1.6	6.0	4.7	1.9	2.9	2.9	2.7	2.9	2.7	2.1	3.1	3.8	3.2	2.9	3.5	3.6	3.1	2.1	1.8	2.1	1.9	1.4	1.5	2.2	1.9	3.5	3.4
1.6	2.0	2.5	2.6	2.1	1.6	1.3	1.3	1.1	.9	2.7	2.4	1.9	1.4	1.2	1.6	2.9	5.2	5.5	2.4	.8	.9	.9	1.0	1.0	2.0	1.9	1.5	1.2	1.1	1.7	1.7	2.1	2.3	1.9	1.2
6.1	6.5	6.9	7.1	7.1	6.9	5.8	4.9	4.2	4.8	5.8	9.6	6.0	5.7	6.2	6.7	7.2	6.5	4.9	5.1	5.0	5.5	10.9	14.2	11.0	6.3	11.4	15.0	15.4	13.0	14.0	16.9	12.7	9.8	8.4	7.7
5.3	6.1	8.9	12.7	14.2	15.7	15.5	14.0	15.3	15.7	12.6	9.7	7.4	8.1	7.8	12.9	12.2	14.1	14.1	15.3	17.4	16.9	14.7	8.2	10.3	11.3	10.6	11.7	9.9	11.6	10.0	6.5	7.1	8.5	11.0	5.1
11.2	9.9	10.4	10.5	10.2	9.9	9.6	9.3	8.9	6.7	8.2	9.4	10.5	10.3	9.5	7.9	8.1	8.2	7.8	7.0	6.1	6.4	7.8	8.1	7.8	8.2	8.0	6.9	5.4	5.2	5.1	5.2	6.1	7.2	12.6	11.6

Figure 28. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2002
Channel: HIRS15 (700 hPa)
NOAA15, using all observations

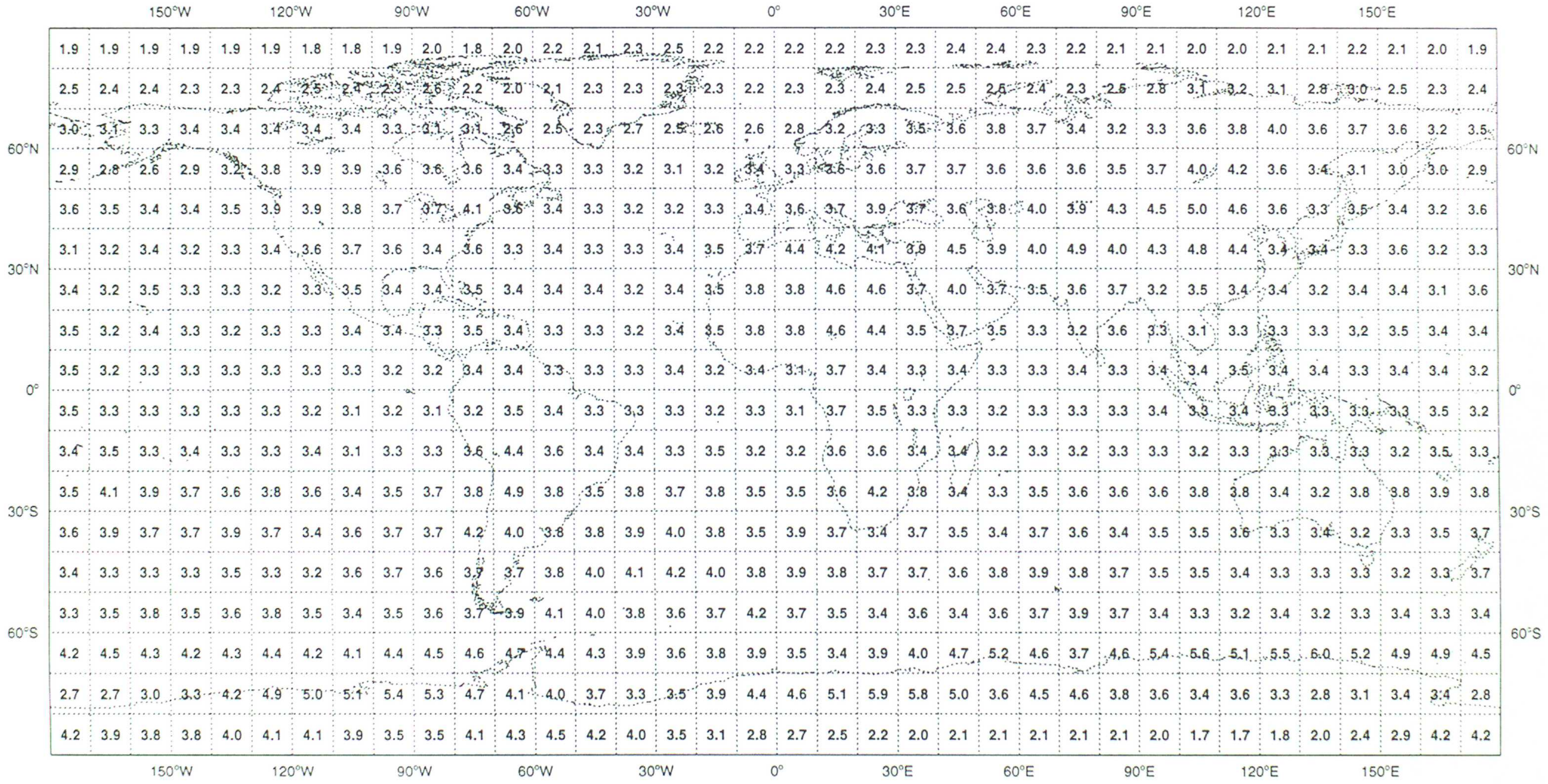


-.3	-.3	-.2	-.2	-.1	.0	.0	.0	-.1	-.2	.0	-.5	-.7	-.6	-1.0	-1.7	-1.6	-1.5	-1.4	-1.3	-1.2	-1.2	-1.1	-1.0	-.9	-.8	-.6	-.6	-.3	-.2	-.2	-.2	-.2	-.3	-.4	-.3
-1.2	-.8	-.8	-.5	-.5	-.7	-1.1	-.8	-.6	-.9	-.5	-.4	-.4	.2	.3	-1.5	-2.0	-2.1	-2.3	-2.3	-2.1	-2.0	-1.9	-1.9	-1.9	-2.4	-3.0	-3.6	-4.1	-3.2	-2.5	-1.9	-2.0	-1.5	-1.4	-1.4
-2.8	-2.6	-3.8	-3.3	-3.4	-3.8	-4.1	-4.2	-3.6	-2.2	-1.8	-1.0	-1.0	.1	-1.0	-1.9	-1.9	-2.2	-3.0	-4.2	-5.3	-5.1	-4.8	-4.4	-4.3	-4.4	-4.9	-5.4	-6.6	-7.2	-6.9	-5.5	-4.9	-5.1	-4.2	-4.1
-2.7	-2.5	-3.5	-3.3	-2.8	-3.9	-6.0	-7.3	-6.2	-4.4	-4.4	-3.9	-3.5	-3.7	-3.9	-4.1	-3.7	-4.1	-5.0	-6.2	-7.6	-7.5	-8.3	-7.5	-6.5	-6.4	-6.1	-7.6	-9.3	-8.9	-8.4	-6.4	-4.0	-4.3	-3.7	-2.9
-5.3	-4.8	-5.1	-5.3	-5.5	-7.3	-10.0	-11.4	-10.0	-9.0	-8.2	-7.1	-6.8	-7.0	-7.2	-7.0	-6.5	-6.8	-6.9	-8.7	-8.8	-9.4	-9.6	-10.1	-9.9	-8.7	-9.7	-11.9	-13.1	-11.1	-9.6	-8.8	-6.5	-5.8	-5.5	-4.5
-9.8	-9.3	-7.9	-8.2	-8.1	-10.0	-12.6	-11.9	-11.6	-11.0	-10.4	-9.9	-9.1	-8.5	-8.4	-8.4	-9.4	-11.0	-11.7	-12.2	-11.1	-12.5	-13.5	-12.8	-12.9	-10.8	-11.3	-13.1	-12.8	-12.7	-11.6	-11.9	-12.1	-10.2	-10.0	-8.6
-10.3	-10.3	-9.1	-9.5	-9.8	-10.4	-11.3	-11.6	-11.6	-11.0	-10.6	-10.3	-9.8	-9.5	-9.9	-10.1	-12.2	-13.9	-14.4	-16.6	-15.0	-15.1	-15.7	-15.7	-15.2	-15.5	-13.3	-11.9	-14.0	-13.6	-12.6	-13.0	-12.7	-11.2	-11.7	-10.1
-10.9	-11.4	-10.9	-11.0	-11.3	-11.2	-11.3	-11.4	-11.1	-11.2	-11.2	-10.9	-10.9	-10.6	-10.7	-10.7	-12.4	-12.5	-13.4	-15.3	-12.9	-12.1	-13.2	-12.9	-12.4	-12.1	-12.1	-11.4	-12.9	-12.8	-12.2	-11.7	-12.6	-11.4	-11.8	-11.4
-11.4	-12.0	-11.8	-11.7	-11.5	-11.4	-11.2	-11.1	-10.9	-11.2	-10.5	-10.7	-10.7	-10.8	-10.9	-10.5	-10.7	-10.1	-10.8	-10.9	-10.8	-10.2	-10.8	-11.4	-11.4	-11.4	-11.7	-11.5	-11.6	-11.4	-11.4	-11.5	-11.8	-11.5	-11.7	-12.1
-11.5	-12.3	-12.0	-11.9	-11.7	-11.4	-11.2	-11.1	-10.6	-10.6	-10.2	-11.1	-10.7	-10.8	-10.6	-10.7	-10.6	-10.3	-10.7	-10.6	-11.1	-9.5	-10.5	-11.0	-11.1	-11.2	-11.4	-11.5	-11.6	-11.5	-11.3	-11.1	-11.0	-11.6	-11.4	-12.3
-10.9	-11.3	-11.4	-11.0	-10.9	-10.5	-10.0	-10.2	-9.5	-9.3	-7.8	-8.1	-9.7	-9.2	-9.4	-9.6	-9.3	-9.4	-9.9	-8.6	-9.3	-8.6	-9.3	-9.8	-10.3	-10.6	-10.7	-10.9	-11.1	-11.0	-10.6	-10.2	-10.4	-10.9	-10.5	-11.3
-7.3	-7.5	-8.1	-7.5	-7.4	-7.2	-6.9	-7.2	-6.6	-5.9	-5.7	-3.2	-6.1	-6.5	-6.9	-6.7	-5.9	-6.5	-6.7	-5.4	-5.0	-6.2	-6.6	-6.9	-6.6	-6.6	-6.2	-6.6	-7.3	-6.9	-5.3	-4.9	-4.9	-6.4	-5.8	-7.0
-2.0	-1.4	-2.4	-1.9	-2.0	-2.0	-1.9	-2.8	-2.8	-2.1	-1.4	-.5	-1.6	-2.7	-2.6	-2.7	-1.7	-2.3	-1.7	-2.0	-2.3	-3.0	-3.1	-2.9	-2.5	-1.8	-1.2	-1.2	-1.4	-1.1	-1.4	-1.4	-.1	-1.3	-.7	-1.3
1.8	2.6	2.1	2.1	2.1	2.0	1.9	1.1	.9	1.1	2.8	2.7	2.6	2.4	2.4	2.9	3.4	3.1	4.0	3.0	2.5	2.2	1.9	1.6	1.8	2.3	2.6	2.9	2.9	3.0	2.5	2.0	2.0	1.7	2.3	2.8
5.5	5.7	6.2	5.8	5.8	5.8	5.4	5.3	4.9	5.0	5.7	6.1	6.7	7.4	7.5	8.4	8.7	9.6	10.0	9.0	8.5	7.5	7.0	7.1	7.1	7.7	7.8	7.5	7.4	7.0	6.2	5.7	5.5	5.1	5.0	5.8
11.6	11.9	12.5	12.1	11.7	11.4	10.9	10.6	10.0	9.9	10.3	11.4	11.5	12.6	13.5	14.5	15.6	16.0	15.4	14.4	13.4	12.7	13.4	14.8	14.8	14.6	15.1	14.9	14.5	13.4	13.0	13.3	11.9	11.1	11.5	11.8
18.9	18.8	18.5	18.7	19.1	19.1	18.2	17.3	17.5	17.3	16.6	17.1	16.2	17.0	17.7	19.6	21.3	23.9	25.6	27.0	27.1	28.1	29.5	28.9	25.6	26.1	29.4	31.4	30.3	29.5	29.2	28.1	26.8	25.4	21.1	19.6
23.2	22.6	22.6	22.9	23.1	23.4	24.1	25.6	26.0	24.3	22.5	21.7	21.9	22.3	23.2	24.4	25.7	27.0	28.1	29.0	30.1	31.5	33.1	34.2	34.7	34.7	34.4	33.8	32.8	32.1	31.2	30.1	29.0	27.6	24.9	23.8

Figure 29. ATOVS SD O-B brightness temperature differences (deg C). JULY 2002

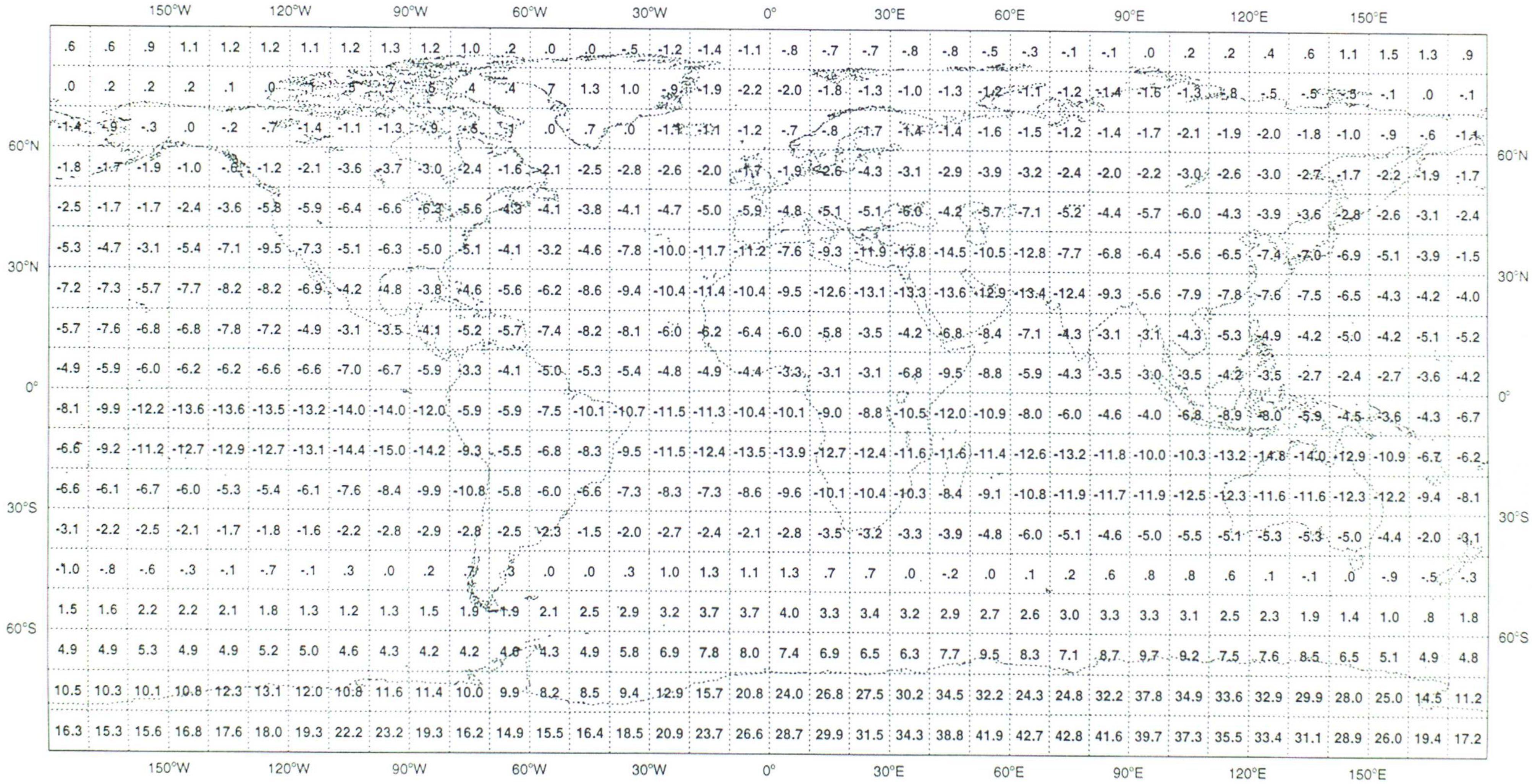
Channel: HIRS15 (700 hPa)

NOAA15, using all observations



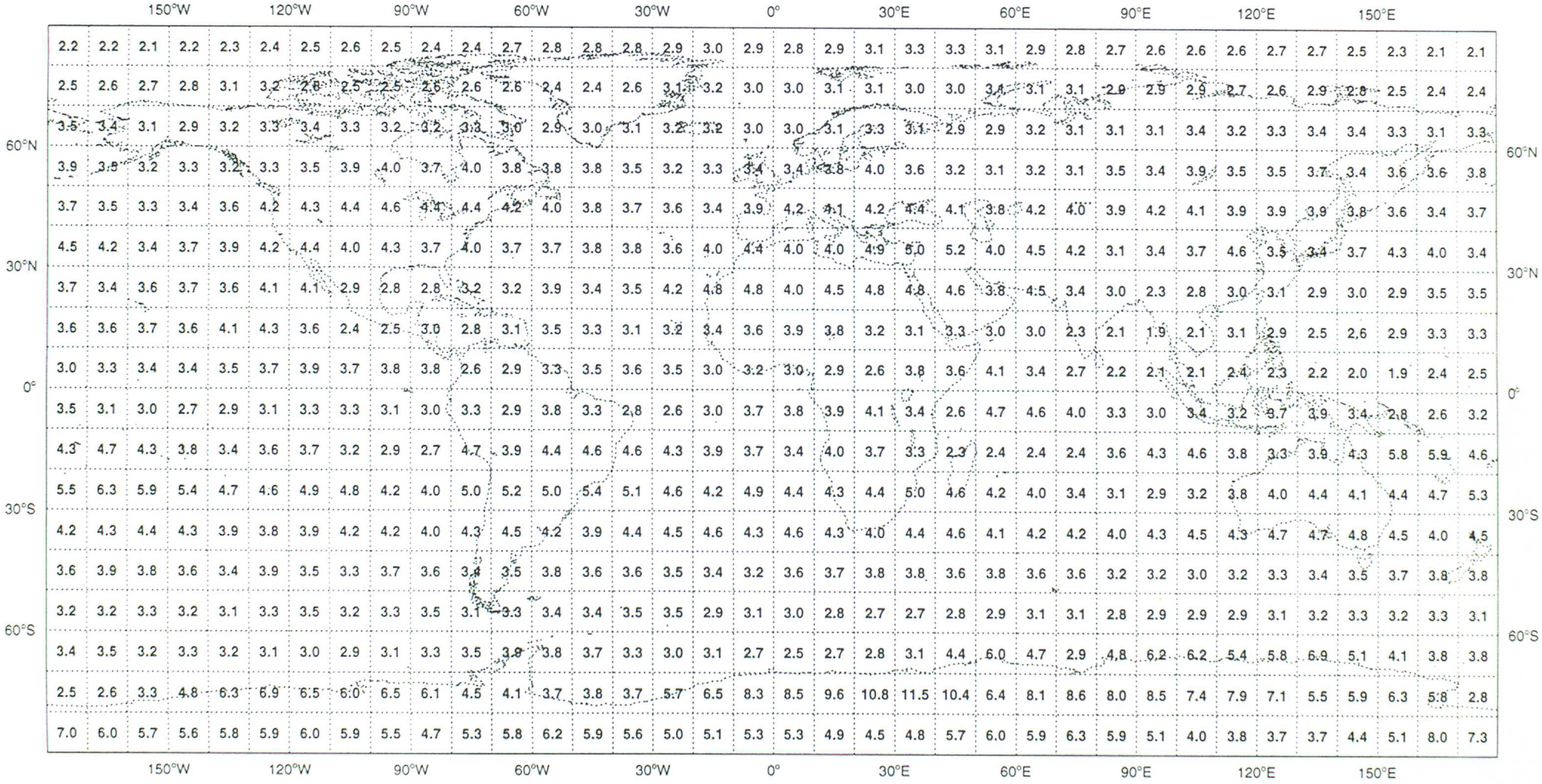
1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	2.0	1.8	2.0	2.2	2.1	2.3	2.5	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.3	2.2	2.1	2.1	2.0	2.0	2.1	2.1	2.2	2.1	2.0	1.9
2.5	2.4	2.4	2.3	2.3	2.4	2.5	2.4	2.3	2.6	2.2	2.0	2.1	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.4	2.5	2.5	2.6	2.4	2.3	2.5	2.8	3.1	3.2	3.1	2.8	3.0	2.5	2.3	2.4
3.0	3.1	3.3	3.4	3.4	3.4	3.4	3.4	3.3	3.1	3.1	2.6	2.5	2.3	2.7	2.5	2.6	2.6	2.8	3.2	3.3	3.5	3.6	3.8	3.7	3.4	3.2	3.3	3.6	3.8	4.0	3.6	3.7	3.6	3.2	3.5
2.9	2.8	2.6	2.9	3.2	3.8	3.9	3.9	3.6	3.6	3.6	3.4	3.3	3.3	3.2	3.1	3.2	3.4	3.3	3.6	3.6	3.7	3.7	3.6	3.6	3.6	3.5	3.7	4.0	4.2	3.6	3.4	3.1	3.0	3.0	2.9
3.6	3.5	3.4	3.4	3.5	3.9	3.9	3.8	3.7	3.7	4.1	3.6	3.4	3.3	3.2	3.2	3.3	3.4	3.6	3.7	3.9	3.7	3.6	3.8	4.0	3.9	4.3	4.5	5.0	4.6	3.6	3.3	3.5	3.4	3.2	3.6
3.1	3.2	3.4	3.2	3.3	3.4	3.6	3.7	3.6	3.4	3.6	3.3	3.4	3.3	3.3	3.4	3.5	3.7	4.4	4.2	4.1	3.9	4.5	3.9	4.0	4.9	4.0	4.3	4.8	4.4	3.4	3.4	3.3	3.6	3.2	3.3
3.4	3.2	3.5	3.3	3.3	3.2	3.3	3.5	3.4	3.4	3.5	3.4	3.4	3.4	3.2	3.4	3.5	3.8	3.8	4.6	4.6	3.7	4.0	3.7	3.5	3.6	3.7	3.2	3.5	3.4	3.4	3.2	3.4	3.4	3.1	3.6
3.5	3.2	3.4	3.3	3.2	3.3	3.3	3.4	3.4	3.3	3.5	3.4	3.3	3.3	3.2	3.4	3.5	3.8	3.8	4.6	4.4	3.5	3.7	3.5	3.3	3.2	3.6	3.3	3.1	3.3	3.3	3.3	3.2	3.5	3.4	3.4
3.5	3.2	3.3	3.3	3.3	3.3	3.3	3.3	3.2	3.2	3.4	3.4	3.3	3.3	3.3	3.4	3.2	3.4	3.1	3.7	3.4	3.3	3.4	3.3	3.3	3.4	3.3	3.4	3.4	3.5	3.4	3.4	3.3	3.4	3.4	3.2
3.5	3.3	3.3	3.3	3.3	3.3	3.2	3.1	3.2	3.1	3.2	3.5	3.4	3.3	3.3	3.3	3.2	3.3	3.1	3.7	3.5	3.3	3.3	3.2	3.3	3.3	3.3	3.4	3.3	3.4	3.3	3.3	3.3	3.3	3.5	3.2
3.4	3.5	3.3	3.4	3.3	3.3	3.4	3.1	3.3	3.3	3.6	4.4	3.6	3.4	3.4	3.3	3.5	3.2	3.2	3.6	3.6	3.4	3.4	3.2	3.3	3.2	3.3	3.3	3.2	3.3	3.3	3.3	3.3	3.2	3.5	3.3
3.5	4.1	3.9	3.7	3.6	3.8	3.6	3.4	3.5	3.7	3.8	4.9	3.8	3.5	3.8	3.7	3.8	3.5	3.5	3.6	4.2	3.8	3.4	3.3	3.5	3.6	3.6	3.6	3.8	3.8	3.4	3.2	3.8	3.8	3.9	3.8
3.6	3.9	3.7	3.7	3.9	3.7	3.4	3.6	3.7	3.7	4.2	4.0	3.8	3.8	3.9	4.0	3.8	3.5	3.9	3.7	3.4	3.7	3.5	3.4	3.7	3.6	3.4	3.5	3.5	3.6	3.3	3.4	3.2	3.3	3.5	3.7
3.4	3.3	3.3	3.3	3.5	3.3	3.2	3.6	3.7	3.6	3.7	3.7	3.8	4.0	4.1	4.2	4.0	3.8	3.9	3.8	3.7	3.7	3.6	3.8	3.9	3.8	3.7	3.5	3.5	3.4	3.3	3.3	3.3	3.2	3.3	3.7
3.3	3.5	3.8	3.5	3.6	3.8	3.5	3.4	3.5	3.6	3.7	3.9	4.1	4.0	3.8	3.6	3.7	4.2	3.7	3.5	3.4	3.6	3.4	3.6	3.7	3.9	3.7	3.4	3.3	3.2	3.4	3.2	3.3	3.4	3.3	3.4
4.2	4.5	4.3	4.2	4.3	4.4	4.2	4.1	4.4	4.5	4.6	4.7	4.4	4.3	3.9	3.6	3.8	3.9	3.5	3.4	3.9	4.0	4.7	5.2	4.6	3.7	4.6	5.4	5.6	5.1	5.5	6.0	5.2	4.9	4.9	4.5
2.7	2.7	3.0	3.3	4.2	4.9	5.0	5.1	5.4	5.3	4.7	4.1	4.0	3.7	3.3	3.5	3.9	4.4	4.6	5.1	5.9	5.8	5.0	3.6	4.5	4.6	3.8	3.6	3.4	3.6	3.3	2.8	3.1	3.4	3.4	2.8
4.2	3.9	3.8	3.8	4.0	4.1	4.1	3.9	3.5	3.5	4.1	4.3	4.5	4.2	4.0	3.5	3.1	2.8	2.7	2.5	2.2	2.0	2.1	2.1	2.1	2.1	2.1	2.0	1.7	1.7	1.8	2.0	2.4	2.9	4.2	4.2

Figure 30. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2002
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations



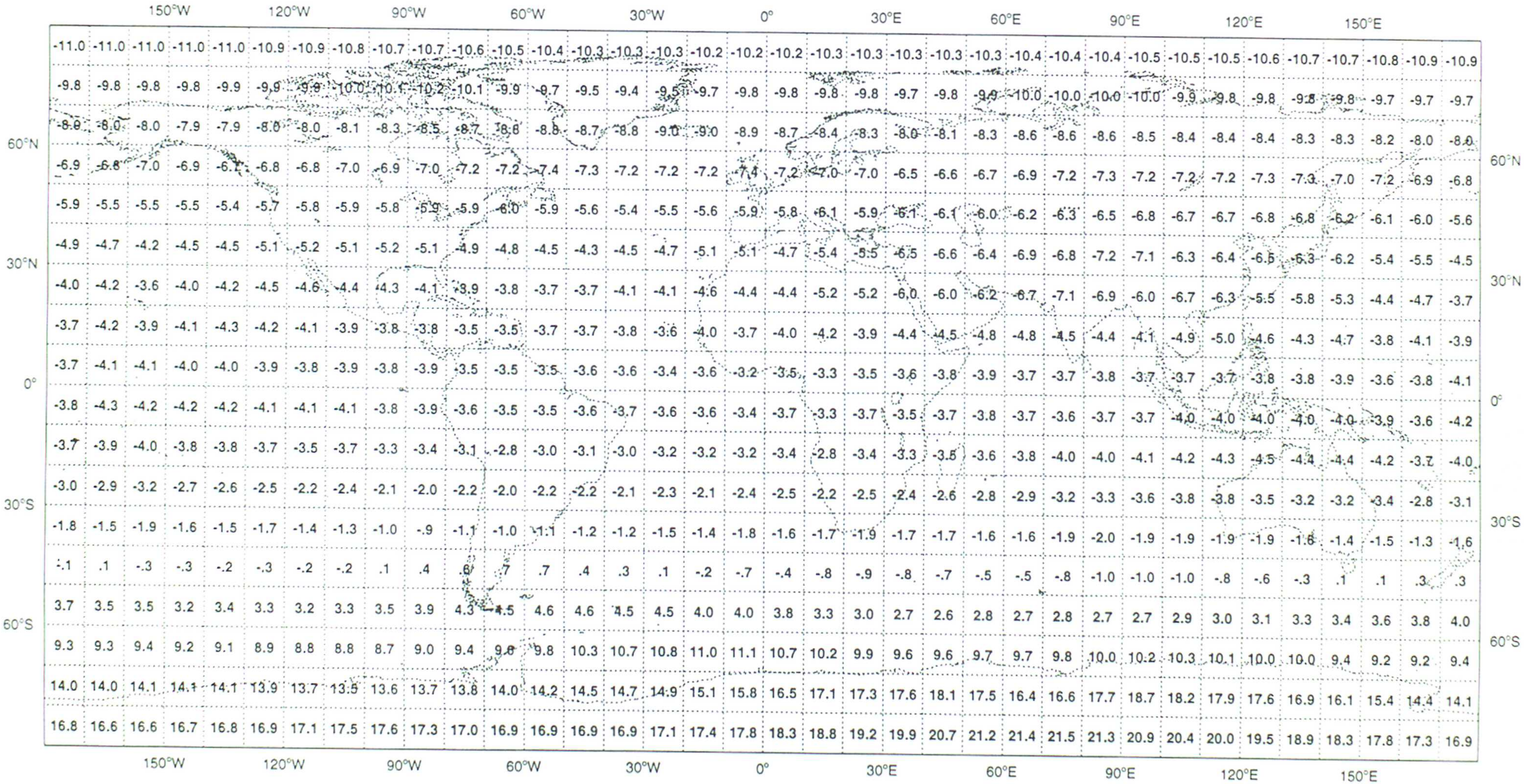
.6	.6	.9	1.1	1.2	1.2	1.1	1.2	1.3	1.2	1.0	.2	.0	.0	-.5	-1.2	-1.4	-1.1	-.8	-.7	-.7	-.8	-.8	-.5	-.3	-.1	-.1	.0	.2	.2	.4	.6	1.1	1.5	1.3	.9
.0	.2	.2	.2	.1	.0	.1	.5	.7	.5	.4	.4	.7	1.3	1.0	-.9	-1.9	-2.2	-2.0	-1.8	-1.3	-1.0	-1.3	-1.2	-1.1	-1.2	-1.4	-1.6	-1.3	-.8	-.5	-.5	-.5	-.1	.0	-.1
-1.4	-.9	-.3	.0	-.2	-.7	-1.4	-1.1	-1.3	-.9	-.6	-.1	.0	.7	.0	-1.1	-1.1	-1.2	-.7	-.8	-1.7	-1.4	-1.4	-1.6	-1.5	-1.2	-1.4	-1.7	-2.1	-1.9	-2.0	-1.8	-1.0	-.9	-.6	-1.1
-1.8	-1.7	-1.9	-1.0	-.6	-1.2	-2.1	-3.6	-3.7	-3.0	-2.4	-1.6	-2.1	-2.5	-2.8	-2.6	-2.0	-1.7	-1.9	-2.6	-4.3	-3.1	-2.9	-3.9	-3.2	-2.4	-2.0	-2.2	-3.0	-2.6	-3.0	-2.7	-1.7	-2.2	-1.9	-1.7
-2.5	-1.7	-1.7	-2.4	-3.6	-5.8	-5.9	-6.4	-6.6	-6.3	-5.6	-4.3	-4.1	-3.8	-4.1	-4.7	-5.0	-5.9	-4.8	-5.1	-5.1	-6.0	-4.2	-5.7	-7.1	-5.2	-4.4	-5.7	-6.0	-4.3	-3.9	-3.6	-2.8	-2.6	-3.1	-2.4
-5.3	-4.7	-3.1	-5.4	-7.1	-9.5	-7.3	-5.1	-6.3	-5.0	-5.1	-4.1	-3.2	-4.6	-7.8	-10.0	-11.7	-11.2	-7.6	-9.3	-11.9	-13.8	-14.5	-10.5	-12.8	-7.7	-6.8	-6.4	-5.6	-6.5	-7.4	-7.0	-6.9	-5.1	-3.9	-1.5
-7.2	-7.3	-5.7	-7.7	-8.2	-8.2	-6.9	-4.2	-4.8	-3.8	-4.6	-5.6	-6.2	-8.6	-9.4	-10.4	-11.4	-10.4	-9.5	-12.6	-13.1	-13.3	-13.6	-12.9	-13.4	-12.4	-9.3	-5.6	-7.9	-7.8	-7.6	-7.5	-6.5	-4.3	-4.2	-4.0
-5.7	-7.6	-6.8	-6.8	-7.8	-7.2	-4.9	-3.1	-3.5	-4.1	-5.2	-5.7	-7.4	-8.2	-8.1	-6.0	-6.2	-6.4	-6.0	-5.8	-3.5	-4.2	-6.8	-8.4	-7.1	-4.3	-3.1	-3.1	-4.3	-5.3	-4.9	-4.2	-5.0	-4.2	-5.1	-5.2
-4.9	-5.9	-6.0	-6.2	-6.2	-6.6	-6.6	-7.0	-6.7	-5.9	-3.3	-4.1	-5.0	-5.3	-5.4	-4.8	-4.9	-4.4	-3.3	-3.1	-3.1	-6.8	-9.5	-8.8	-5.9	-4.3	-3.5	-3.0	-3.5	-4.2	-3.5	-2.7	-2.4	-2.7	-3.6	-4.2
-8.1	-9.9	-12.2	-13.6	-13.6	-13.5	-13.2	-14.0	-14.0	-12.0	-5.9	-5.9	-7.5	-10.1	-10.7	-11.5	-11.3	-10.4	-10.1	-9.0	-8.8	-10.5	-12.0	-10.9	-8.0	-6.0	-4.6	-4.0	-6.8	-8.9	-8.0	-5.9	-4.5	-3.6	-4.3	-6.7
-6.6	-9.2	-11.2	-12.7	-12.9	-12.7	-13.1	-14.4	-15.0	-14.2	-9.3	-5.5	-6.8	-8.3	-9.5	-11.5	-12.4	-13.5	-13.9	-12.7	-12.4	-11.6	-11.6	-11.4	-12.6	-13.2	-11.8	-10.0	-10.3	-13.2	-14.8	-14.0	-12.9	-10.9	-6.7	-6.2
-6.6	-6.1	-6.7	-6.0	-5.3	-5.4	-6.1	-7.6	-8.4	-9.9	-10.8	-5.8	-6.0	-6.6	-7.3	-8.3	-7.3	-8.6	-9.6	-10.1	-10.4	-10.3	-8.4	-9.1	-10.8	-11.9	-11.7	-11.9	-12.5	-12.3	-11.6	-11.6	-12.3	-12.2	-9.4	-8.1
-3.1	-2.2	-2.5	-2.1	-1.7	-1.8	-1.6	-2.2	-2.8	-2.9	-2.8	-2.5	-2.3	-1.5	-2.0	-2.7	-2.4	-2.1	-2.8	-3.5	-3.2	-3.3	-3.9	-4.8	-6.0	-5.1	-4.6	-5.0	-5.5	-5.1	-5.3	-5.3	-5.0	-4.4	-2.0	-3.1
-1.0	-.8	-.6	-.3	-.1	-.7	-.1	.3	.0	.2	.7	.3	.0	.0	.3	1.0	1.3	1.1	1.3	.7	.7	.0	-.2	.0	.1	.2	.6	.8	.8	.6	.1	-.1	.0	-.9	-.5	-.3
1.5	1.6	2.2	2.2	2.1	1.8	1.3	1.2	1.3	1.5	1.9	1.9	2.1	2.5	2.9	3.2	3.7	3.7	4.0	3.3	3.4	3.2	2.9	2.7	2.6	3.0	3.3	3.3	3.1	2.5	2.3	1.9	1.4	1.0	.8	1.8
4.9	4.9	5.3	4.9	4.9	5.2	5.0	4.6	4.3	4.2	4.2	4.6	4.3	4.9	5.8	6.9	7.8	8.0	7.4	6.9	6.5	6.3	7.7	9.5	8.3	7.1	8.7	9.7	9.2	7.5	7.6	8.5	6.5	5.1	4.9	4.8
10.5	10.3	10.1	10.8	12.3	13.1	12.0	10.8	11.6	11.4	10.0	9.9	8.2	8.5	9.4	12.9	15.7	20.8	24.0	26.8	27.5	30.2	34.5	32.2	24.3	24.8	32.2	37.8	34.9	33.6	32.9	29.9	28.0	25.0	14.5	11.2
16.3	15.3	15.6	16.8	17.6	18.0	19.3	22.2	23.2	19.3	16.2	14.9	15.5	16.4	18.5	20.9	23.7	26.6	28.7	29.9	31.5	34.3	38.8	41.9	42.7	42.8	41.6	39.7	37.3	35.5	33.4	31.1	28.9	26.0	19.4	17.2

Figure 31. ATOVS SD O-B brightness temperature differences (deg C). JULY 2002
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations



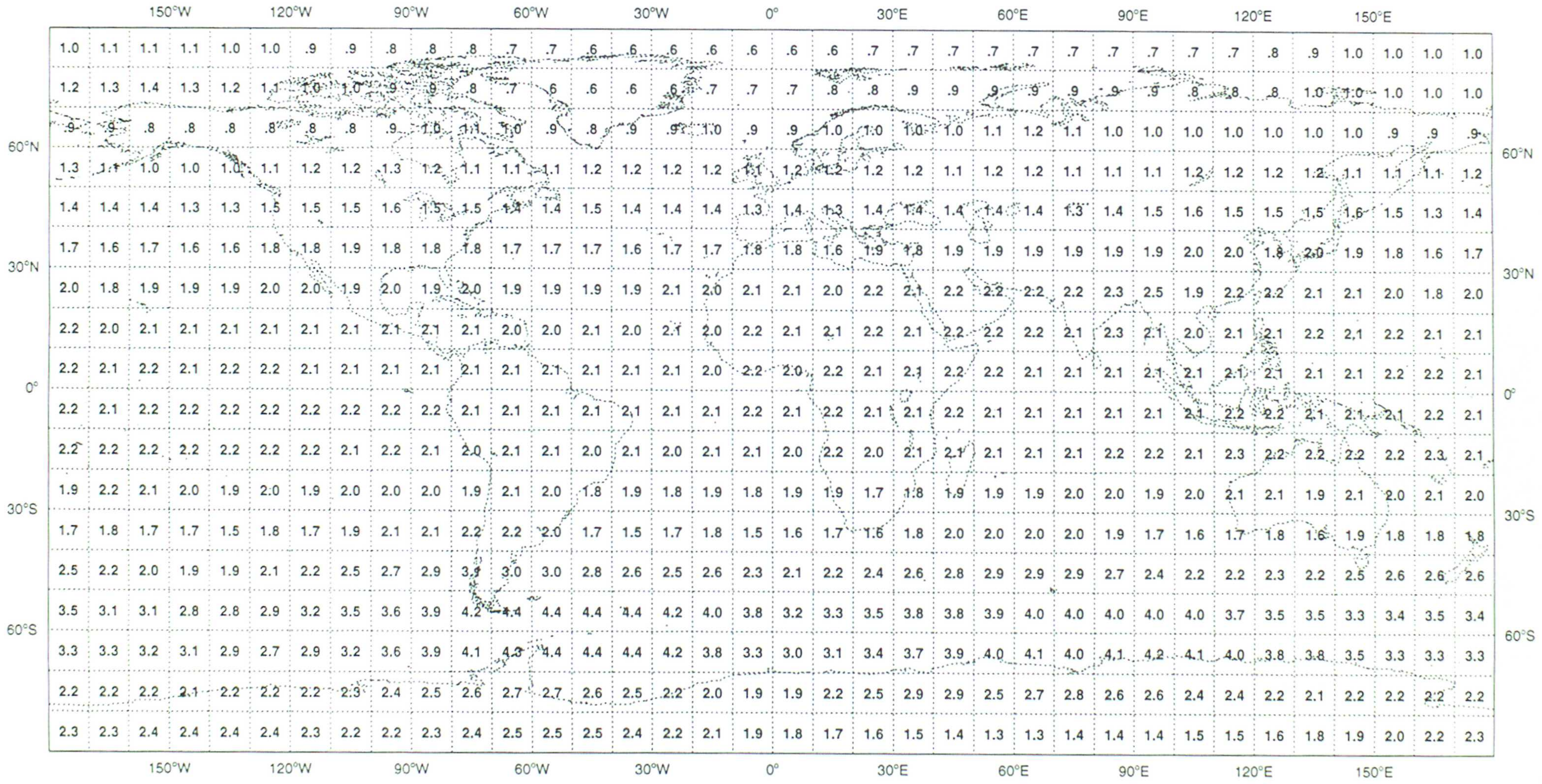
2.2	2.2	2.1	2.2	2.3	2.4	2.5	2.6	2.5	2.4	2.4	2.7	2.8	2.8	2.8	2.9	3.0	2.9	2.8	2.9	3.1	3.3	3.3	3.1	2.9	2.8	2.7	2.6	2.6	2.6	2.7	2.7	2.5	2.3	2.1	2.1
2.5	2.6	2.7	2.8	3.1	3.2	2.8	2.5	2.5	2.6	2.6	2.6	2.4	2.4	2.6	3.1	3.2	3.0	3.0	3.1	3.1	3.0	3.0	3.4	3.1	3.1	2.9	2.9	2.9	2.7	2.6	2.9	2.8	2.5	2.4	2.4
3.5	3.4	3.1	2.9	3.2	3.3	3.4	3.3	3.2	3.2	3.3	3.0	2.9	3.0	3.1	3.2	3.2	3.0	3.0	3.1	3.3	3.1	2.9	2.9	3.2	3.1	3.1	3.1	3.4	3.2	3.3	3.4	3.4	3.3	3.1	3.3
3.9	3.5	3.2	3.3	3.2	3.3	3.5	3.9	4.0	3.7	4.0	3.8	3.8	3.8	3.5	3.2	3.3	3.4	3.4	3.8	4.0	3.6	3.2	3.1	3.2	3.1	3.5	3.4	3.9	3.5	3.5	3.7	3.4	3.6	3.6	3.8
3.7	3.5	3.3	3.4	3.6	4.2	4.3	4.4	4.6	4.4	4.4	4.2	4.0	3.8	3.7	3.6	3.4	3.9	4.2	4.1	4.2	4.4	4.1	3.8	4.2	4.0	3.9	4.2	4.1	3.9	3.9	3.9	3.8	3.6	3.4	3.7
4.5	4.2	3.4	3.7	3.9	4.2	4.4	4.0	4.3	3.7	4.0	3.7	3.7	3.8	3.8	3.6	4.0	4.4	4.0	4.0	4.9	5.0	5.2	4.0	4.5	4.2	3.1	3.4	3.7	4.6	3.5	3.4	3.7	4.3	4.0	3.4
3.7	3.4	3.6	3.7	3.6	4.1	4.1	2.9	2.8	2.8	3.2	3.2	3.9	3.4	3.5	4.2	4.8	4.8	4.0	4.5	4.8	4.8	4.6	3.8	4.5	3.4	3.0	2.3	2.8	3.0	3.1	2.9	3.0	2.9	3.5	3.5
3.6	3.6	3.7	3.6	4.1	4.3	3.6	2.4	2.5	3.0	2.8	3.1	3.5	3.3	3.1	3.2	3.4	3.6	3.9	3.8	3.2	3.1	3.3	3.0	3.0	2.3	2.1	1.9	2.1	3.1	2.9	2.5	2.6	2.9	3.3	3.3
3.0	3.3	3.4	3.4	3.5	3.7	3.9	3.7	3.8	3.8	2.6	2.9	3.3	3.5	3.6	3.5	3.0	3.2	3.0	2.9	2.6	3.8	3.6	4.1	3.4	2.7	2.2	2.1	2.1	2.4	2.3	2.2	2.0	1.9	2.4	2.5
3.5	3.1	3.0	2.7	2.9	3.1	3.3	3.3	3.1	3.0	3.3	2.9	3.8	3.3	2.8	2.6	3.0	3.7	3.8	3.9	4.1	3.4	2.6	4.7	4.6	4.0	3.3	3.0	3.4	3.2	3.7	3.9	3.4	2.8	2.6	3.2
4.3	4.7	4.3	3.8	3.4	3.6	3.7	3.2	2.9	2.7	4.7	3.9	4.4	4.6	4.6	4.3	3.9	3.7	3.4	4.0	3.7	3.3	2.3	2.4	2.4	2.4	3.6	4.3	4.6	3.8	3.3	3.9	4.3	5.8	5.9	4.6
5.5	6.3	5.9	5.4	4.7	4.6	4.9	4.8	4.2	4.0	5.0	5.2	5.0	5.4	5.1	4.6	4.2	4.9	4.4	4.3	4.4	5.0	4.6	4.2	4.0	3.4	3.1	2.9	3.2	3.8	4.0	4.4	4.1	4.4	4.7	5.3
4.2	4.3	4.4	4.3	3.9	3.8	3.9	4.2	4.2	4.0	4.3	4.5	4.2	3.9	4.4	4.5	4.6	4.3	4.6	4.3	4.0	4.4	4.6	4.1	4.2	4.2	4.0	4.3	4.5	4.3	4.7	4.7	4.8	4.5	4.0	4.5
3.6	3.9	3.8	3.6	3.4	3.9	3.5	3.3	3.7	3.6	3.4	3.5	3.8	3.6	3.6	3.5	3.4	3.2	3.6	3.7	3.8	3.8	3.6	3.8	3.6	3.6	3.2	3.2	3.0	3.2	3.3	3.4	3.5	3.7	3.8	3.8
3.2	3.2	3.3	3.2	3.1	3.3	3.5	3.2	3.3	3.5	3.1	3.3	3.4	3.4	3.5	3.5	2.9	3.1	3.0	2.8	2.7	2.7	2.8	2.9	3.1	3.1	2.8	2.9	2.9	2.9	3.1	3.2	3.3	3.2	3.3	3.1
3.4	3.5	3.2	3.3	3.2	3.1	3.0	2.9	3.1	3.3	3.5	3.8	3.8	3.7	3.3	3.0	3.1	2.7	2.5	2.7	2.8	3.1	4.4	6.0	4.7	2.9	4.8	6.2	6.2	5.4	5.8	6.9	5.1	4.1	3.8	3.8
2.5	2.6	3.3	4.8	6.3	6.9	6.5	6.0	6.5	6.1	4.5	4.1	3.7	3.8	3.7	5.7	6.5	8.3	8.5	9.6	10.8	11.5	10.4	6.4	8.1	8.6	8.0	8.5	7.4	7.9	7.1	5.5	5.9	6.3	5.8	2.8
7.0	6.0	5.7	5.6	5.8	5.9	6.0	5.9	5.5	4.7	5.3	5.8	6.2	5.9	5.6	5.0	5.1	5.3	5.3	4.9	4.5	4.8	5.7	6.0	5.9	6.3	5.9	5.1	4.0	3.8	3.7	3.7	4.4	5.1	8.0	7.3

Figure 32. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2002
Channel: HIRS4 (400 hPa)
NOAA15, using all observations



-11.0	-11.0	-11.0	-11.0	-11.0	-10.9	-10.9	-10.8	-10.7	-10.7	-10.6	-10.5	-10.4	-10.3	-10.3	-10.3	-10.2	-10.2	-10.2	-10.3	-10.3	-10.3	-10.3	-10.3	-10.4	-10.4	-10.4	-10.5	-10.5	-10.5	-10.6	-10.7	-10.7	-10.8	-10.9	-10.9
-9.8	-9.8	-9.8	-9.8	-9.9	-9.9	-9.9	-10.0	-10.1	-10.2	-10.1	-9.9	-9.7	-9.5	-9.4	-9.5	-9.7	-9.8	-9.8	-9.8	-9.8	-9.7	-9.8	-9.9	-10.0	-10.0	-10.0	-10.0	-9.9	-9.8	-9.8	-9.8	-9.8	-9.7	-9.7	-9.7
-8.0	-8.0	-8.0	-7.9	-7.9	-8.0	-8.0	-8.1	-8.3	-8.5	-8.7	-8.8	-8.8	-8.7	-8.8	-9.0	-9.0	-8.9	-8.7	-8.4	-8.3	-8.0	-8.1	-8.3	-8.6	-8.6	-8.6	-8.5	-8.4	-8.4	-8.4	-8.3	-8.3	-8.2	-8.0	-8.0
-6.9	-6.8	-7.0	-6.9	-6.7	-6.8	-6.8	-7.0	-6.9	-7.0	-7.2	-7.2	-7.4	-7.3	-7.2	-7.2	-7.2	-7.4	-7.2	-7.0	-7.0	-6.5	-6.6	-6.7	-6.9	-7.2	-7.3	-7.2	-7.2	-7.2	-7.3	-7.3	-7.0	-7.2	-6.9	-6.8
-5.9	-5.5	-5.5	-5.5	-5.4	-5.7	-5.8	-5.9	-5.8	-5.9	-5.9	-6.0	-5.9	-5.6	-5.4	-5.5	-5.6	-5.9	-5.8	-6.1	-5.9	-6.1	-6.1	-6.0	-6.2	-6.3	-6.5	-6.8	-6.7	-6.7	-6.8	-6.8	-6.2	-6.1	-6.0	-5.6
-4.9	-4.7	-4.2	-4.5	-4.5	-5.1	-5.2	-5.1	-5.2	-5.1	-4.9	-4.8	-4.5	-4.3	-4.5	-4.7	-5.1	-5.1	-4.7	-5.4	-5.5	-6.5	-6.6	-6.4	-6.9	-6.8	-7.2	-7.1	-6.3	-6.4	-6.5	-6.3	-6.2	-5.4	-5.5	-4.5
-4.0	-4.2	-3.6	-4.0	-4.2	-4.5	-4.6	-4.4	-4.3	-4.1	-3.9	-3.8	-3.7	-3.7	-4.1	-4.1	-4.6	-4.4	-4.4	-5.2	-5.2	-6.0	-6.0	-6.2	-6.7	-7.1	-6.9	-6.0	-6.7	-6.3	-5.5	-5.8	-5.3	-4.4	-4.7	-3.7
-3.7	-4.2	-3.9	-4.1	-4.3	-4.2	-4.1	-3.9	-3.8	-3.8	-3.5	-3.5	-3.7	-3.7	-3.8	-3.6	-4.0	-3.7	-4.0	-4.2	-3.9	-4.4	-4.5	-4.8	-4.8	-4.5	-4.4	-4.1	-4.9	-5.0	-4.6	-4.3	-4.7	-3.8	-4.1	-3.9
-3.7	-4.1	-4.1	-4.0	-4.0	-3.9	-3.8	-3.9	-3.8	-3.9	-3.5	-3.5	-3.5	-3.6	-3.6	-3.4	-3.6	-3.2	-3.5	-3.3	-3.5	-3.6	-3.8	-3.9	-3.7	-3.7	-3.8	-3.7	-3.7	-3.7	-3.8	-3.8	-3.9	-3.6	-3.8	-4.1
-3.8	-4.3	-4.2	-4.2	-4.2	-4.1	-4.1	-4.1	-3.8	-3.9	-3.6	-3.5	-3.5	-3.6	-3.7	-3.6	-3.6	-3.4	-3.7	-3.3	-3.7	-3.5	-3.7	-3.8	-3.7	-3.6	-3.7	-3.7	-4.0	-4.0	-4.0	-4.0	-4.0	-3.9	-3.6	-4.2
-3.7	-3.9	-4.0	-3.8	-3.8	-3.7	-3.5	-3.7	-3.3	-3.4	-3.1	-2.8	-3.0	-3.1	-3.0	-3.2	-3.2	-3.2	-3.4	-2.8	-3.4	-3.3	-3.5	-3.6	-3.8	-4.0	-4.0	-4.1	-4.2	-4.3	-4.5	-4.4	-4.4	-4.2	-3.7	-4.0
-3.0	-2.9	-3.2	-2.7	-2.6	-2.5	-2.2	-2.4	-2.1	-2.0	-2.2	-2.0	-2.2	-2.2	-2.1	-2.3	-2.1	-2.4	-2.5	-2.2	-2.5	-2.4	-2.6	-2.8	-2.9	-3.2	-3.3	-3.6	-3.8	-3.8	-3.5	-3.2	-3.2	-3.4	-2.8	-3.1
-1.8	-1.5	-1.9	-1.6	-1.5	-1.7	-1.4	-1.3	-1.0	-.9	-1.1	-1.0	-1.1	-1.2	-1.2	-1.5	-1.4	-1.8	-1.6	-1.7	-1.9	-1.7	-1.7	-1.6	-1.6	-1.9	-2.0	-1.9	-1.9	-1.9	-1.9	-1.6	-1.4	-1.5	-1.3	-1.6
-.1	.1	-.3	-.3	-.2	-.3	-.2	-.2	.1	.4	.6	.7	.7	.4	.3	.1	-.2	-.7	-.4	-.8	-.9	-.8	-.7	-.5	-.5	-.8	-1.0	-1.0	-1.0	-.8	-.6	-.3	.1	.1	.3	.3
3.7	3.5	3.5	3.2	3.4	3.3	3.2	3.3	3.5	3.9	4.3	4.5	4.6	4.6	4.5	4.5	4.0	4.0	3.8	3.3	3.0	2.7	2.6	2.8	2.7	2.8	2.7	2.7	2.9	3.0	3.1	3.3	3.4	3.6	3.8	4.0
9.3	9.3	9.4	9.2	9.1	8.9	8.8	8.8	8.7	9.0	9.4	9.8	9.8	10.3	10.7	10.8	11.0	11.1	10.7	10.2	9.9	9.6	9.6	9.7	9.7	9.8	10.0	10.2	10.3	10.1	10.0	10.0	9.4	9.2	9.2	9.4
14.0	14.0	14.1	14.1	14.1	13.9	13.7	13.5	13.6	13.7	13.8	14.0	14.2	14.5	14.7	14.9	15.1	15.8	16.5	17.1	17.3	17.6	18.1	17.5	16.4	16.6	17.7	18.7	18.2	17.9	17.6	16.9	16.1	15.4	14.4	14.1
16.8	16.6	16.6	16.7	16.8	16.9	17.1	17.5	17.6	17.3	17.0	16.9	16.9	16.9	16.9	17.1	17.4	17.8	18.3	18.8	19.2	19.9	20.7	21.2	21.4	21.5	21.3	20.9	20.4	20.0	19.5	18.9	18.3	17.8	17.3	16.9

Figure 33. ATOVS SD O-B brightness temperature differences (deg C). JULY 2002
Channel: HIRS4 (400 hPa)
NOAA15, using all observations



1.0	1.1	1.1	1.1	1.0	1.0	.9	.9	.8	.8	.8	.7	.7	.6	.6	.6	.6	.6	.6	.6	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.8	.9	1.0	1.0	1.0	1.0
1.2	1.3	1.4	1.3	1.2	1.1	1.0	1.0	.9	.9	.8	.7	.6	.6	.6	.6	.7	.7	.7	.8	.8	.9	.9	.9	.9	.9	.9	.9	.8	.8	.8	1.0	1.0	1.0	1.0	1.0
.9	.9	.8	.8	.8	.8	.8	.8	.9	1.0	1.1	1.0	.9	.8	.9	.9	1.0	.9	.9	1.0	1.0	1.0	1.0	1.1	1.2	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	.9	.9	.9
1.3	1.1	1.0	1.0	1.0	1.1	1.2	1.2	1.3	1.2	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.1	1.2	1.2	1.2	1.2	1.1	1.2	1.2	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.2
1.4	1.4	1.4	1.3	1.3	1.5	1.5	1.5	1.6	1.5	1.5	1.4	1.4	1.5	1.4	1.4	1.4	1.3	1.4	1.3	1.4	1.4	1.4	1.4	1.4	1.3	1.4	1.5	1.6	1.5	1.5	1.5	1.6	1.5	1.3	1.4
1.7	1.6	1.7	1.6	1.6	1.8	1.8	1.9	1.8	1.8	1.8	1.7	1.7	1.7	1.6	1.7	1.7	1.8	1.8	1.6	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.8	2.0	1.9	1.8	1.6	1.7
2.0	1.8	1.9	1.9	1.9	2.0	2.0	1.9	2.0	1.9	2.0	1.9	1.9	1.9	1.9	2.1	2.0	2.1	2.1	2.0	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.5	1.9	2.2	2.2	2.1	2.1	2.0	1.8	2.0
2.2	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.1	2.0	2.2	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.1	2.3	2.1	2.0	2.1	2.1	2.2	2.1	2.2	2.1	2.1
2.2	2.1	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.2	2.0	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1
2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.1
2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.0	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.0	2.2	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.3	2.2	2.2	2.2	2.2	2.3	2.1
1.9	2.2	2.1	2.0	1.9	2.0	1.9	2.0	2.0	2.0	1.9	2.1	2.0	1.8	1.9	1.8	1.9	1.8	1.9	1.9	1.7	1.8	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.1	2.1	1.9	2.1	2.0	2.1	2.0
1.7	1.8	1.7	1.7	1.5	1.8	1.7	1.9	2.1	2.1	2.2	2.2	2.0	1.7	1.5	1.7	1.8	1.5	1.6	1.7	1.6	1.8	2.0	2.0	2.0	2.0	1.9	1.7	1.6	1.7	1.8	1.6	1.9	1.8	1.8	1.8
2.5	2.2	2.0	1.9	1.9	2.1	2.2	2.5	2.7	2.9	3.1	3.0	3.0	2.8	2.6	2.5	2.6	2.3	2.1	2.2	2.4	2.6	2.8	2.9	2.9	2.9	2.7	2.4	2.2	2.2	2.3	2.2	2.5	2.6	2.6	2.6
3.5	3.1	3.1	2.8	2.8	2.9	3.2	3.5	3.6	3.9	4.2	4.4	4.4	4.4	4.4	4.2	4.0	3.8	3.2	3.3	3.5	3.8	3.8	3.9	4.0	4.0	4.0	4.0	4.0	3.7	3.5	3.5	3.3	3.4	3.5	3.4
3.3	3.3	3.2	3.1	2.9	2.7	2.9	3.2	3.6	3.9	4.1	4.3	4.4	4.4	4.4	4.2	3.8	3.3	3.0	3.1	3.4	3.7	3.9	4.0	4.1	4.0	4.1	4.2	4.1	4.0	3.8	3.8	3.5	3.3	3.3	3.3
2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.3	2.4	2.5	2.6	2.7	2.7	2.6	2.5	2.2	2.0	1.9	1.9	2.2	2.5	2.9	2.9	2.5	2.7	2.8	2.6	2.6	2.4	2.4	2.2	2.1	2.2	2.2	2.2	2.2
2.3	2.3	2.4	2.4	2.4	2.4	2.3	2.2	2.2	2.3	2.4	2.5	2.5	2.5	2.4	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.4	1.4	1.4	1.5	1.5	1.6	1.8	1.9	2.0	2.2	2.3

Figure 34. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2002
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations

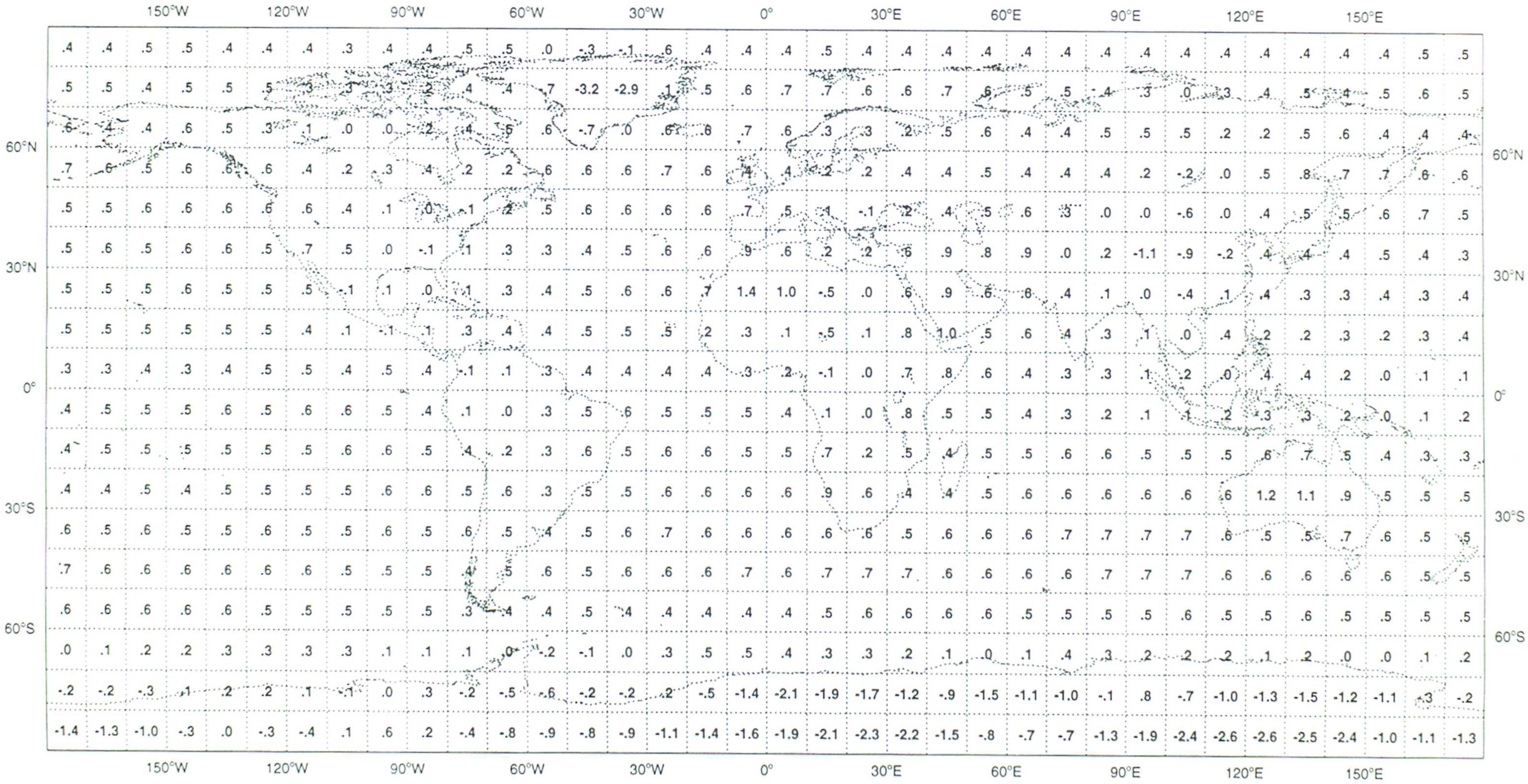

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.4 .4 .5 .5 .4 .4 .4 .3 .4 .4 .5 .5 .0 -.3 -.1 .6 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5
.5 .5 .4 .5 .5 .5 .3 .3 .3 .2 .4 .4 .7 -3.2 -2.9 .1 .5 .6 .7 .7 .6 .6 .7 .6 .5 .5 .4 .3 .0 .3 .4 .5 .4 .5 .6 .5
.6 .4 .4 .6 .5 .3 .1 .0 .0 .2 .4 .5 .6 -.7 .0 .6 .8 .7 .6 .3 .3 .2 .5 .6 .4 .4 .5 .5 .5 .2 .2 .5 .6 .4 .4 .4
.7 .6 .5 .6 .6 .6 .4 .2 .3 .4 .2 .2 .6 .6 .6 .7 .6 .4 .4 .2 .2 .4 .4 .5 .4 .4 .4 .2 -.2 .0 .5 .8 .7 .7 .6 .6
.5 .5 .6 .6 .6 .6 .6 .4 .1 .0 -.1 .2 .5 .6 .6 .6 .6 .7 .5 .1 -.1 .2 .4 .5 .6 .3 .0 .0 -.6 .0 .4 .5 .5 .6 .7 .5
.5 .6 .5 .6 .6 .5 .7 .5 .0 -.1 .1 .3 .3 .4 .5 .6 .6 .9 .6 .2 .2 .6 .9 .8 .9 .0 .2 -1.1 -.9 -.2 .4 .4 .4 .5 .4 .3
.5 .5 .5 .6 .5 .5 .5 -.1 .1 .0 .1 .3 .4 .5 .6 .6 .7 1.4 1.0 -.5 .0 .6 .9 .6 .6 .4 .1 .0 -.4 .1 .4 .3 .3 .4 .3 .4
.5 .5 .5 .5 .5 .5 .4 .1 -.1 .1 .3 .4 .4 .5 .5 .5 .2 .3 .1 -.5 .1 .8 1.0 .5 .6 .4 .3 .1 .0 .4 .2 .2 .3 .2 .3 .4
.3 .3 .4 .3 .4 .5 .5 .4 .5 .4 -.1 .1 .3 .4 .4 .4 .4 .3 .2 -.1 .0 .7 .8 .6 .4 .3 .3 .1 .2 .0 .4 .4 .2 .0 .1 .1
.4 .5 .5 .5 .6 .5 .6 .6 .5 .4 .1 .0 .3 .5 .6 .5 .5 .5 .4 .1 .0 .8 .5 .5 .4 .3 .2 .1 .1 .2 .3 .3 .2 .0 .1 .2
.4 .5 .5 .5 .5 .5 .5 .6 .6 .5 .4 .2 .3 .6 .5 .6 .6 .5 .5 .7 .2 .5 .4 .5 .5 .6 .6 .5 .5 .5 .6 .7 .5 .4 .3 .3
.4 .4 .5 .4 .5 .5 .5 .5 .6 .6 .5 .6 .3 .5 .5 .6 .6 .6 .6 .9 .6 .4 .4 .5 .6 .6 .6 .6 .6 .6 1.2 1.1 .9 .5 .5 .5
.6 .5 .6 .5 .5 .6 .5 .5 .6 .5 .6 .5 .4 .5 .6 .7 .6 .6 .6 .6 .6 .5 .6 .6 .6 .7 .7 .7 .7 .6 .5 .5 .7 .6 .5 .5
.7 .6 .6 .6 .6 .6 .6 .5 .5 .5 .4 .5 .6 .5 .6 .6 .6 .7 .6 .7 .7 .7 .6 .6 .6 .6 .7 .7 .7 .6 .6 .6 .6 .6 .5 .5
.6 .6 .6 .6 .6 .5 .5 .5 .5 .5 .3 .4 .4 .5 .4 .4 .4 .4 .4 .5 .6 .6 .6 .6 .5 .5 .5 .5 .6 .5 .5 .6 .5 .5 .5 .5
.0 .1 .2 .2 .3 .3 .3 .3 .1 .1 .1 .0 -.2 -.1 .0 .3 .5 .5 .4 .3 .3 .2 .1 .0 .1 .4 .3 .2 .2 .2 .1 .2 .0 .0 .1 .2
-.2 -.2 -.3 .1 .2 .2 .1 -.1 .0 .3 -.2 -.5 -.6 -.2 -.2 .2 -.5 -1.4 -2.1 -1.9 -1.7 -1.2 -.9 -1.5 -1.1 -1.0 -.1 .8 -.7 -1.0 -1.3 -1.5 -1.2 -1.1 .3 -.2
-1.4 -1.3 -1.0 -.3 .0 -.3 -.4 .1 .6 .2 -.4 -.8 -.9 -.8 -.9 -1.1 -1.4 -1.6 -1.9 -2.1 -2.3 -2.2 -1.5 -.8 -.7 -.7 -1.3 -1.9 -2.4 -2.6 -2.6 -2.5 -2.4 -1.0 -1.1 -1.3
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E

Figure 35. ATOVS SD O-B brightness temperature differences (deg C). JULY 2002
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations

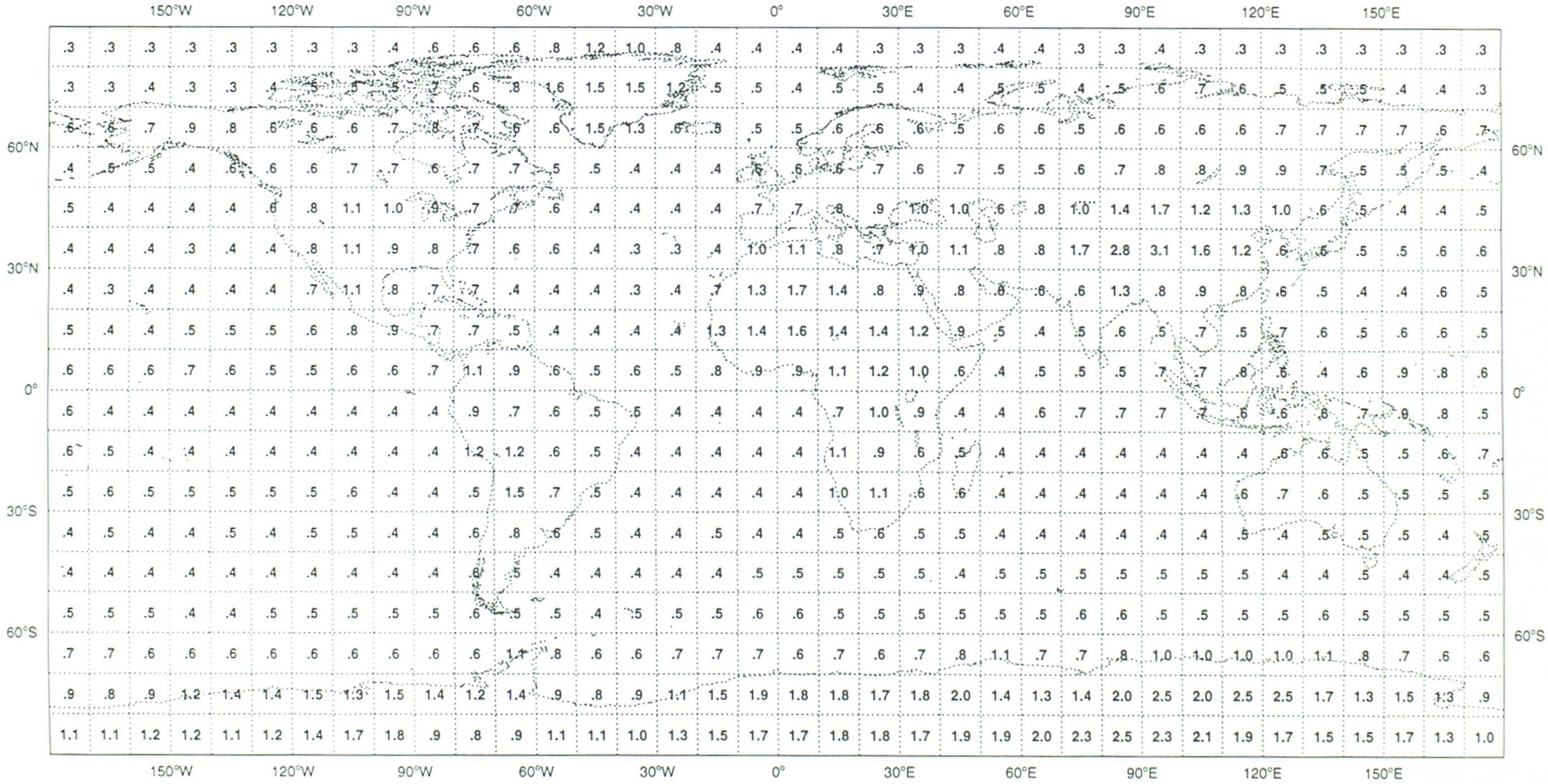
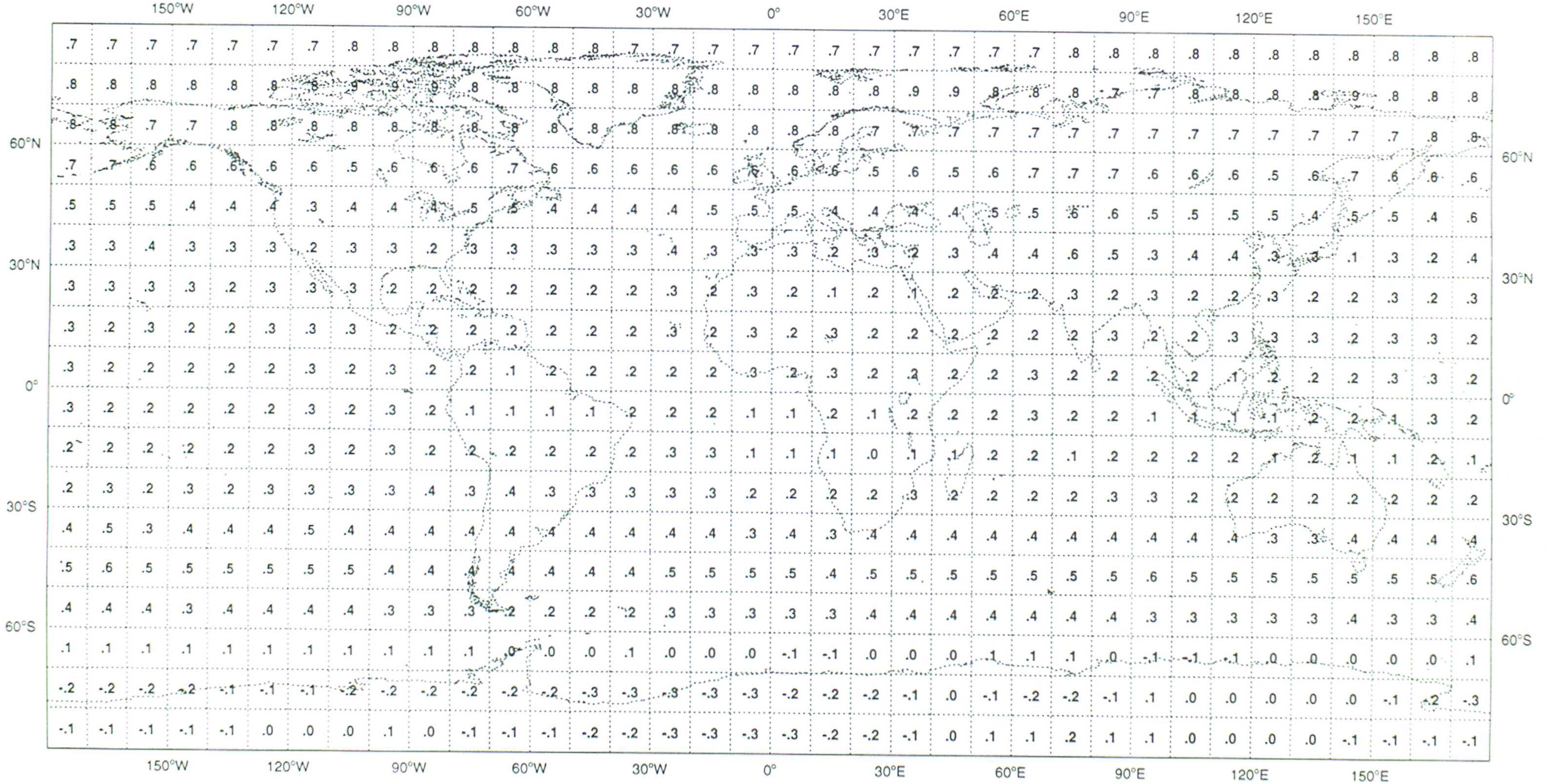

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 36. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2002
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations



.7	.7	.7	.7	.7	.7	.7	.8	.8	.8	.8	.8	.8	.8	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8
.8	.8	.8	.8	.8	.8	.8	.9	.9	.9	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.9	.9	.8	.8	.8	.7	.7	.8	.8	.8	.8	.9	.8	.8	.8
.8	.8	.7	.7	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.8	.8
.7	.7	.6	.6	.6	.6	.6	.5	.6	.6	.6	.7	.6	.6	.6	.6	.6	.6	.6	.6	.5	.6	.5	.6	.7	.7	.7	.6	.6	.6	.5	.6	.7	.6	.6	.6
.5	.5	.5	.4	.4	.4	.3	.4	.4	.4	.5	.5	.4	.4	.4	.4	.5	.5	.5	.4	.4	.4	.4	.5	.5	.6	.6	.5	.5	.5	.5	.4	.5	.5	.4	.6
.3	.3	.4	.3	.3	.3	.2	.3	.3	.2	.3	.3	.3	.3	.3	.4	.3	.3	.3	.2	.3	.2	.3	.4	.4	.6	.5	.3	.4	.4	.3	.3	.1	.3	.2	.4
.3	.3	.3	.3	.2	.3	.3	.3	.2	.2	.2	.2	.2	.2	.2	.3	.2	.3	.2	.1	.2	.1	.2	.2	.2	.3	.2	.3	.2	.2	.3	.2	.2	.3	.2	.3
.3	.2	.3	.2	.2	.3	.3	.3	.2	.2	.2	.2	.2	.2	.2	.3	.2	.3	.2	.3	.2	.2	.2	.2	.2	.2	.3	.2	.2	.3	.3	.3	.2	.3	.3	.2
.3	.2	.2	.2	.2	.2	.3	.2	.3	.2	.2	.1	.2	.2	.2	.2	.2	.3	.2	.3	.2	.2	.2	.2	.3	.2	.2	.2	.2	.1	.2	.2	.2	.3	.3	.2
.3	.2	.2	.2	.2	.2	.3	.2	.3	.2	.1	.1	.1	.1	.2	.2	.2	.1	.1	.2	.1	.2	.2	.2	.3	.2	.2	.1	.1	.1	.1	.2	.2	.1	.3	.2
.2	.2	.2	.2	.2	.2	.3	.2	.3	.2	.2	.2	.2	.2	.2	.3	.3	.1	.1	.1	.0	.1	.1	.2	.2	.1	.2	.2	.2	.2	.1	.2	.1	.1	.2	.1
.2	.3	.2	.3	.2	.3	.3	.3	.3	.4	.3	.4	.3	.3	.3	.3	.3	.2	.2	.2	.2	.3	.2	.2	.2	.2	.3	.3	.2	.2	.2	.2	.2	.2	.2	.2
.4	.5	.3	.4	.4	.4	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.3	.4	.3	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.3	.3	.4	.4	.4	.4
.5	.6	.5	.5	.5	.5	.5	.5	.4	.4	.4	.4	.4	.4	.4	.5	.5	.5	.5	.4	.5	.5	.5	.5	.5	.5	.5	.6	.5	.5	.5	.5	.5	.5	.5	.6
.4	.4	.4	.3	.4	.4	.4	.4	.3	.3	.3	.2	.2	.2	.2	.3	.3	.3	.3	.3	.4	.4	.4	.4	.4	.4	.4	.3	.3	.3	.3	.3	.4	.3	.3	.4
.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.0	.0	.0	.1	.0	.0	.0	-.1	-.1	.0	.0	.0	.1	.1	.1	.0	-.1	-.1	-.1	.0	.0	.0	.0	.0	.1
-.2	-.2	-.2	-.2	-.1	-.1	-.1	-.2	-.2	-.2	-.2	-.2	-.2	-.3	-.3	-.3	-.3	-.3	-.2	-.2	-.2	-.1	.0	-.1	-.2	-.2	-.1	.1	.0	.0	.0	.0	.0	-.1	-.2	-.3
-.1	-.1	-.1	-.1	-.1	.0	.0	.0	.1	.0	-.1	-.1	-.1	-.2	-.2	-.3	-.3	-.3	-.3	-.2	-.2	-.1	.0	.1	.1	.2	.1	.1	.0	.0	.0	.0	-.1	-.1	-.1	-.1

Figure 37. ATOVS SD O-B brightness temperature differences (deg C). JULY 2002
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

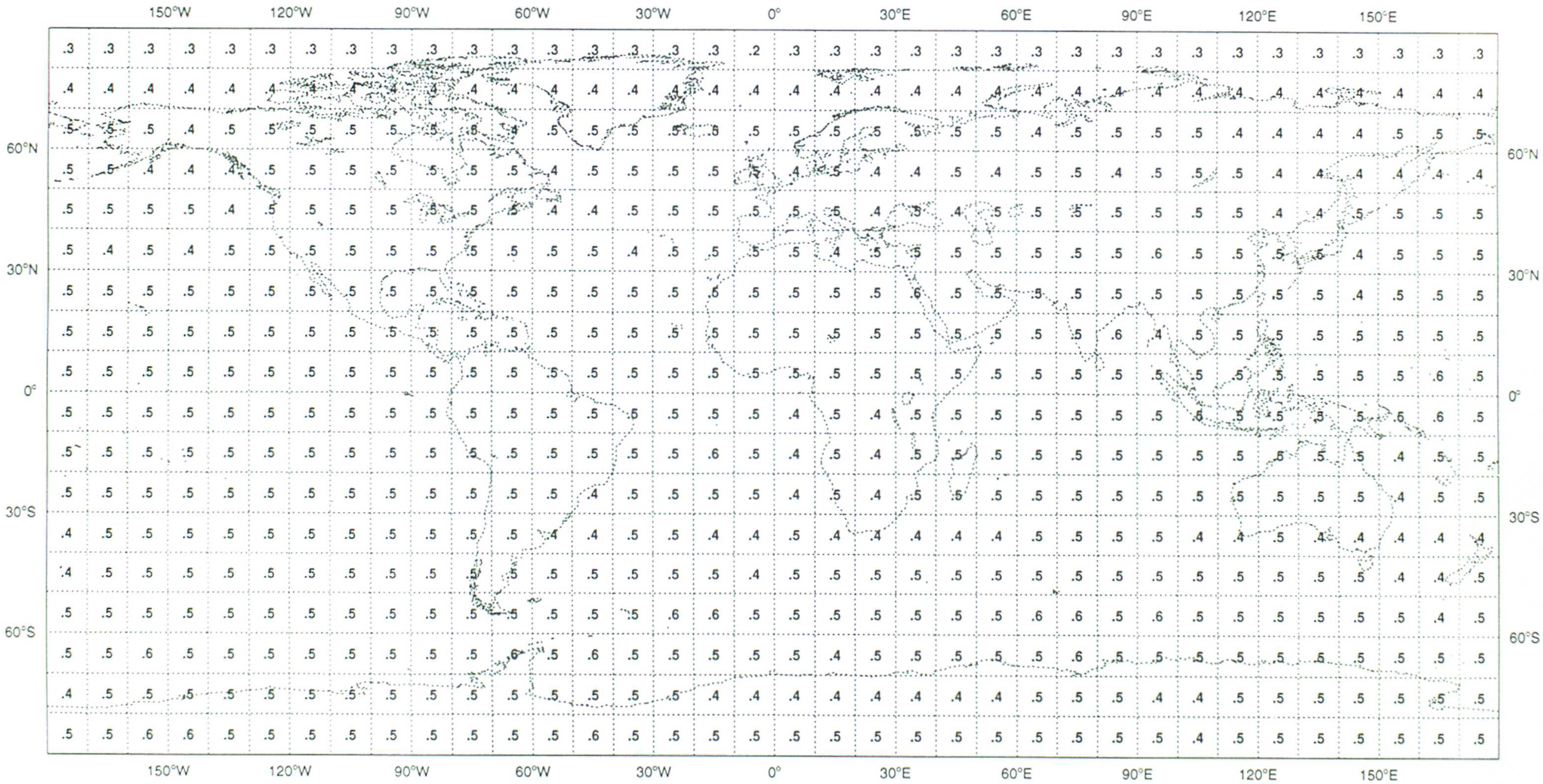

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .6 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .4 .4 .4 .4 .5 .5 .5
.5 .5 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .4 .5 .4 .4 .5 .4 .5 .5 .4 .5 .5 .5 .4 .4 .4 .4 .4 .4
.5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5 .5 .5 .5 .5 .5 .4 .5 .4 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5 .5 .5 .5
.5 .4 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .4 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .4 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .4 .5 .5 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .6 .6 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .5 .4 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .4 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5
.4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5 .5 .4 .4 .5 .4 .4 .4 .4 .4 .5 .5 .5 .5 .4 .4 .5 .4 .4 .4 .4 .4
.4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .5 .5 .5 .6 .6 .5 .6 .5 .5 .5 .5 .5 .5 .4 .5
.5 .5 .6 .5 .5 .5 .5 .5 .5 .5 .5 .6 .5 .6 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .4 .4 .5 .5 .5 .5 .5 .5 .5
.5 .5 .6 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5

Figure 38. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2002
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations

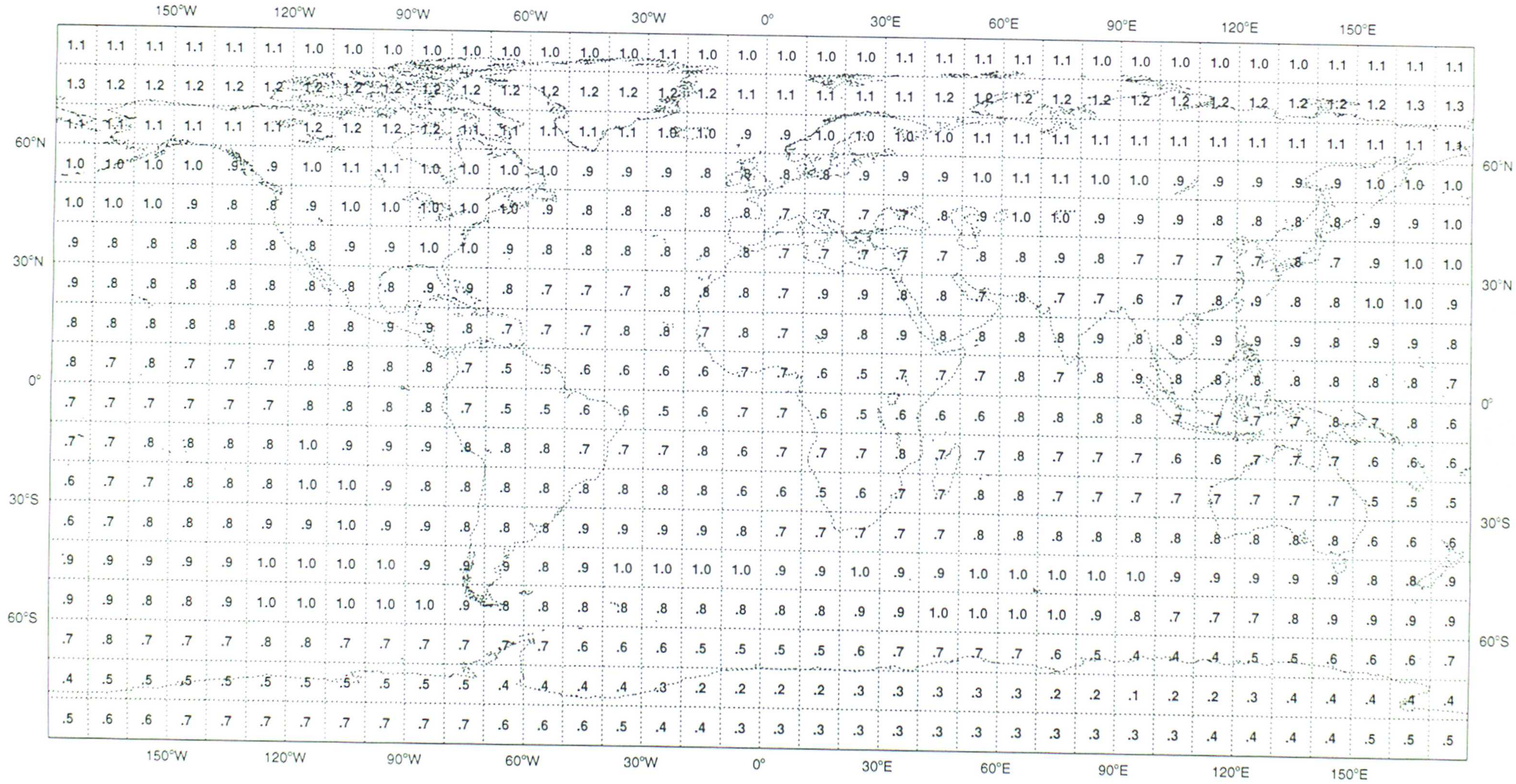

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 39. ATOVS SD O-B brightness temperature differences (deg C). JULY 2002
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations

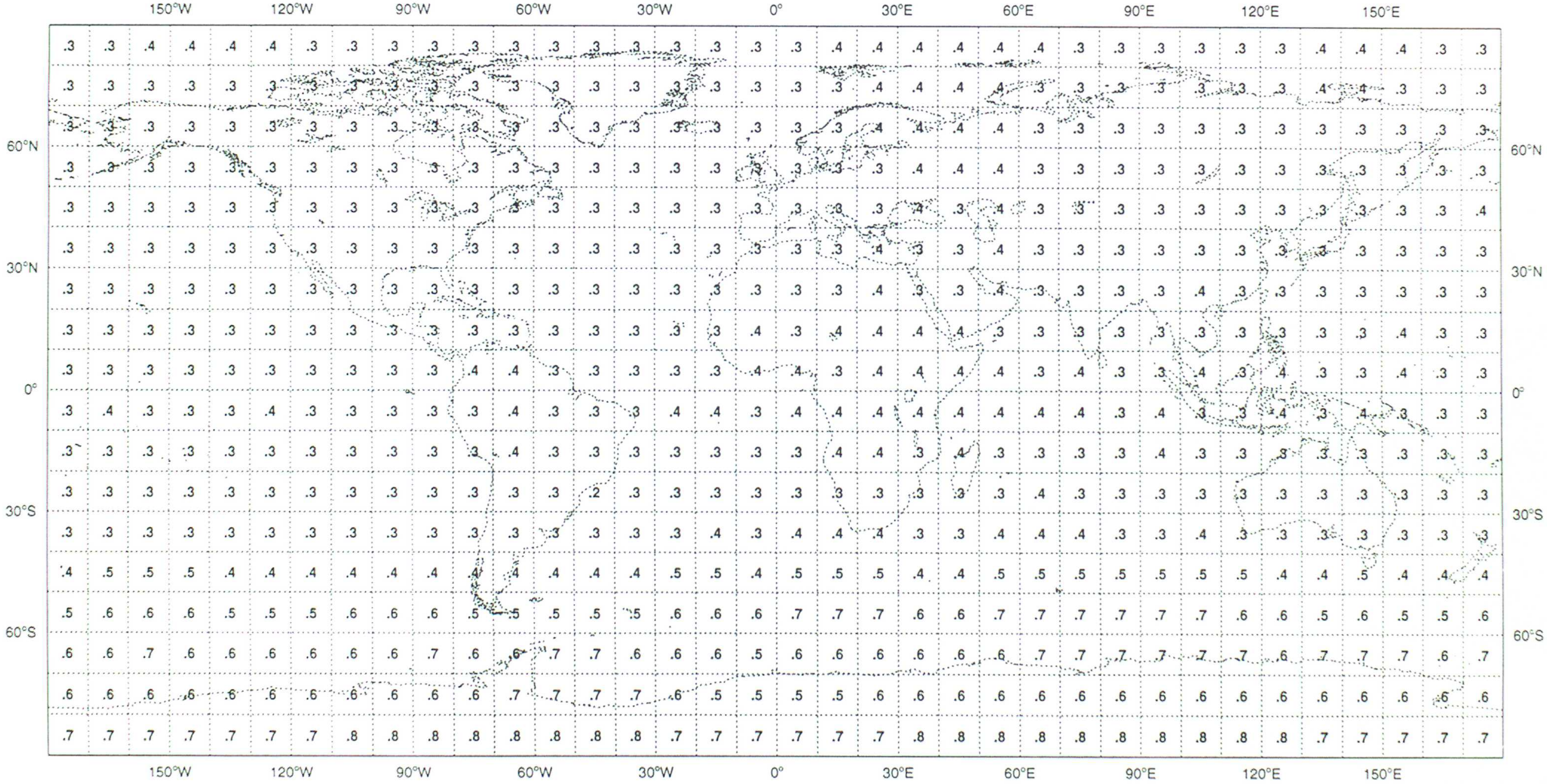
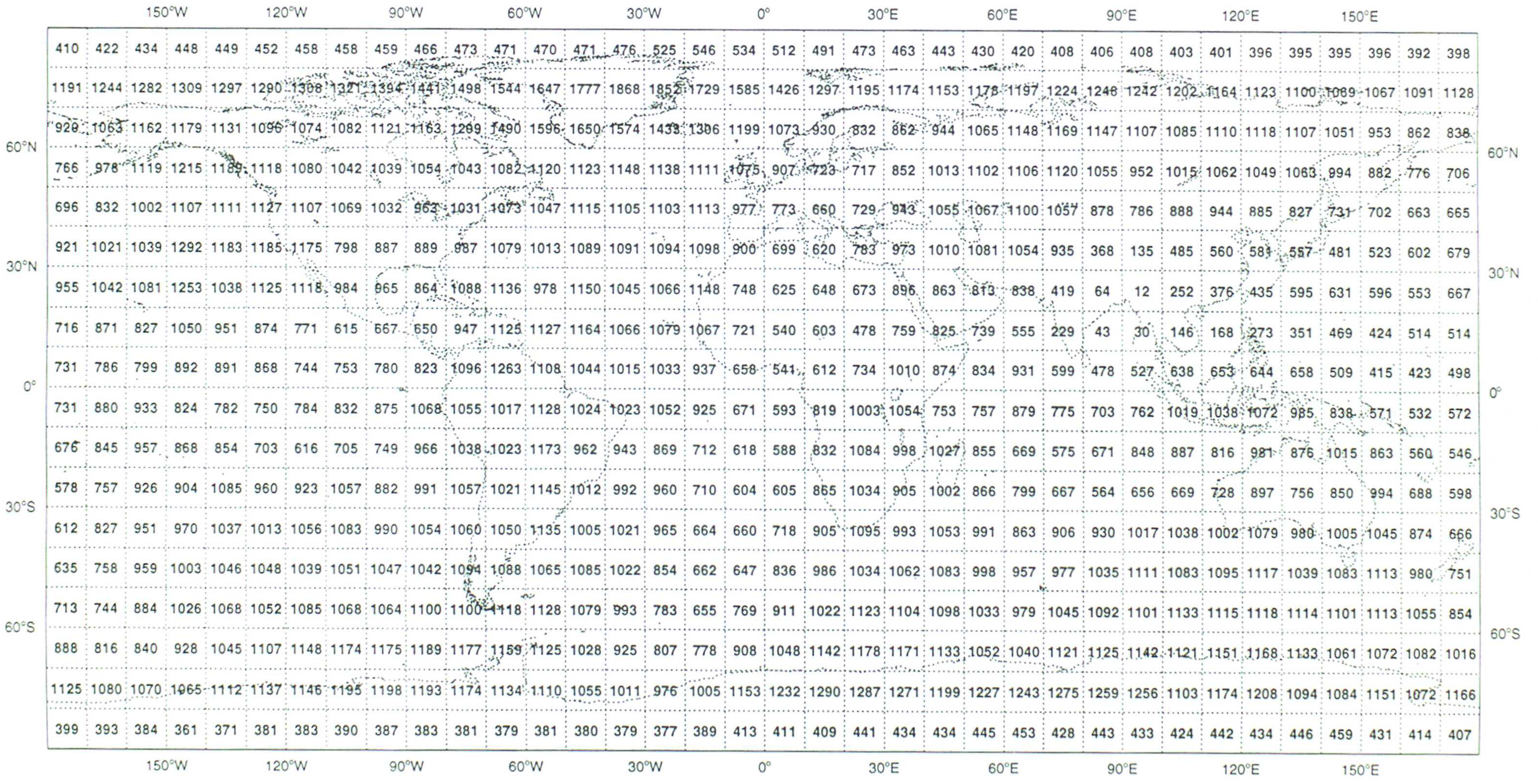
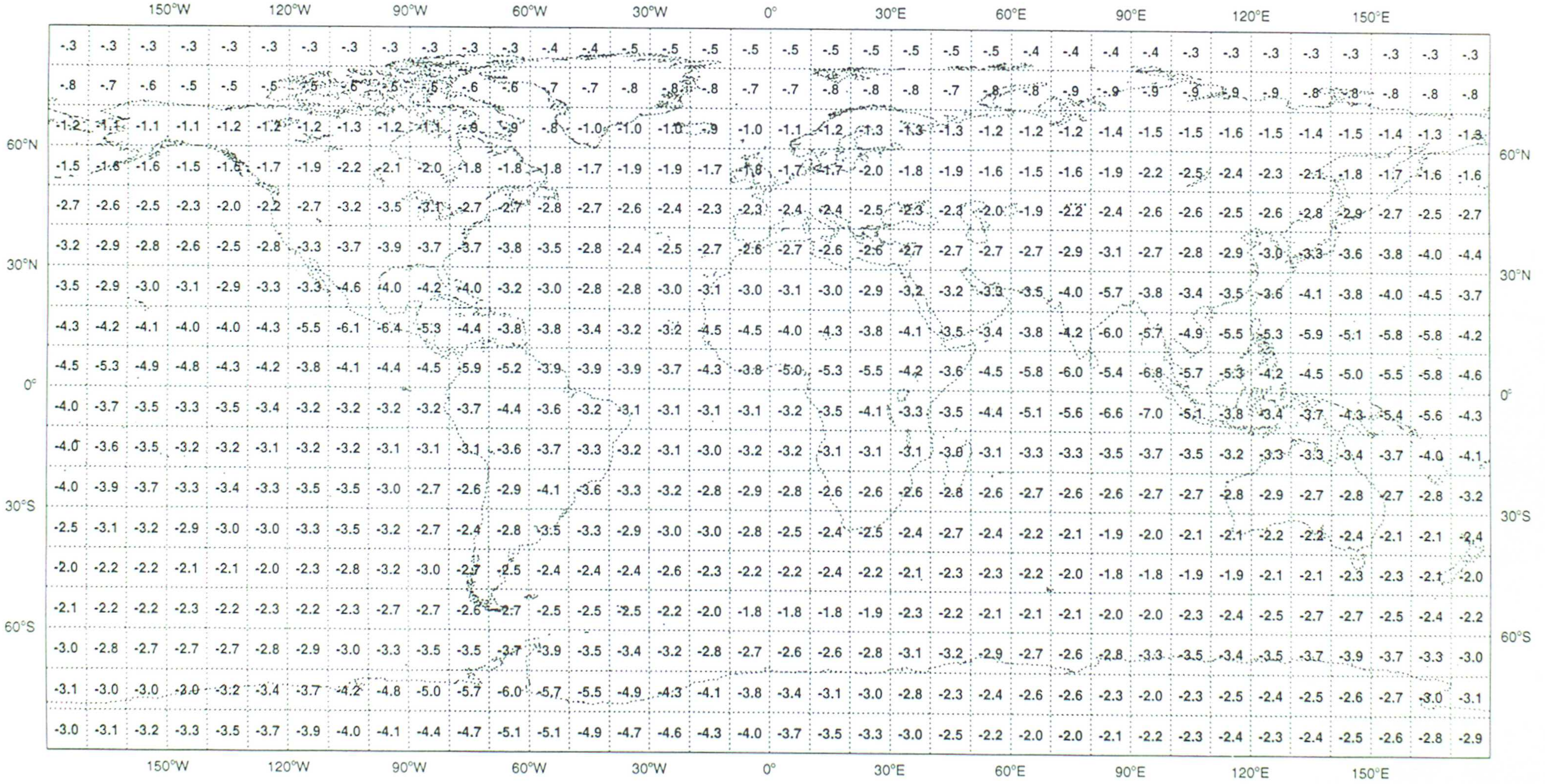

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .4 .4 .4 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .4 .4 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .4 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .3 .3 .3 .3 .3 .4 .4 .3 .4 .4 .4 .4 .3 .4 .3 .3 .4 .3 .4 .3 .3 .4 .3 .3
.3 .4 .3 .3 .3 .4 .3 .3 .3 .3 .3 .4 .3 .3 .3 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .3 .3 .4 .3 .4 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .4 .4 .3 .4 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .4 .4 .4 .3 .3 .4 .4 .4 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3
.4 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .5 .5 .5 .4 .4 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5 .4 .4 .4
.5 .6 .6 .6 .5 .5 .5 .6 .6 .6 .5 .5 .5 .5 .5 .6 .6 .6 .7 .7 .7 .6 .6 .7 .7 .7 .7 .7 .7 .6 .6 .5 .6 .5 .5 .6
.6 .6 .7 .6 .6 .6 .6 .6 .6 .7 .6 .6 .7 .7 .6 .6 .6 .5 .6 .6 .6 .6 .6 .6 .7 .7 .7 .7 .7 .7 .6 .7 .7 .7 .6 .7
.6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .7 .7 .7 .7 .6 .5 .5 .5 .5 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6
.7 .7 .7 .7 .7 .7 .7 .8 .8 .8 .8 .8 .8 .8 .8 .7 .7 .7 .7 .7 .7 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .7 .7 .7 .7 .7

Figure 40. ATOVS mean daily count. JULY 2002
NOAA16, using all observations
Global average number of observations in 24 hours = 579191



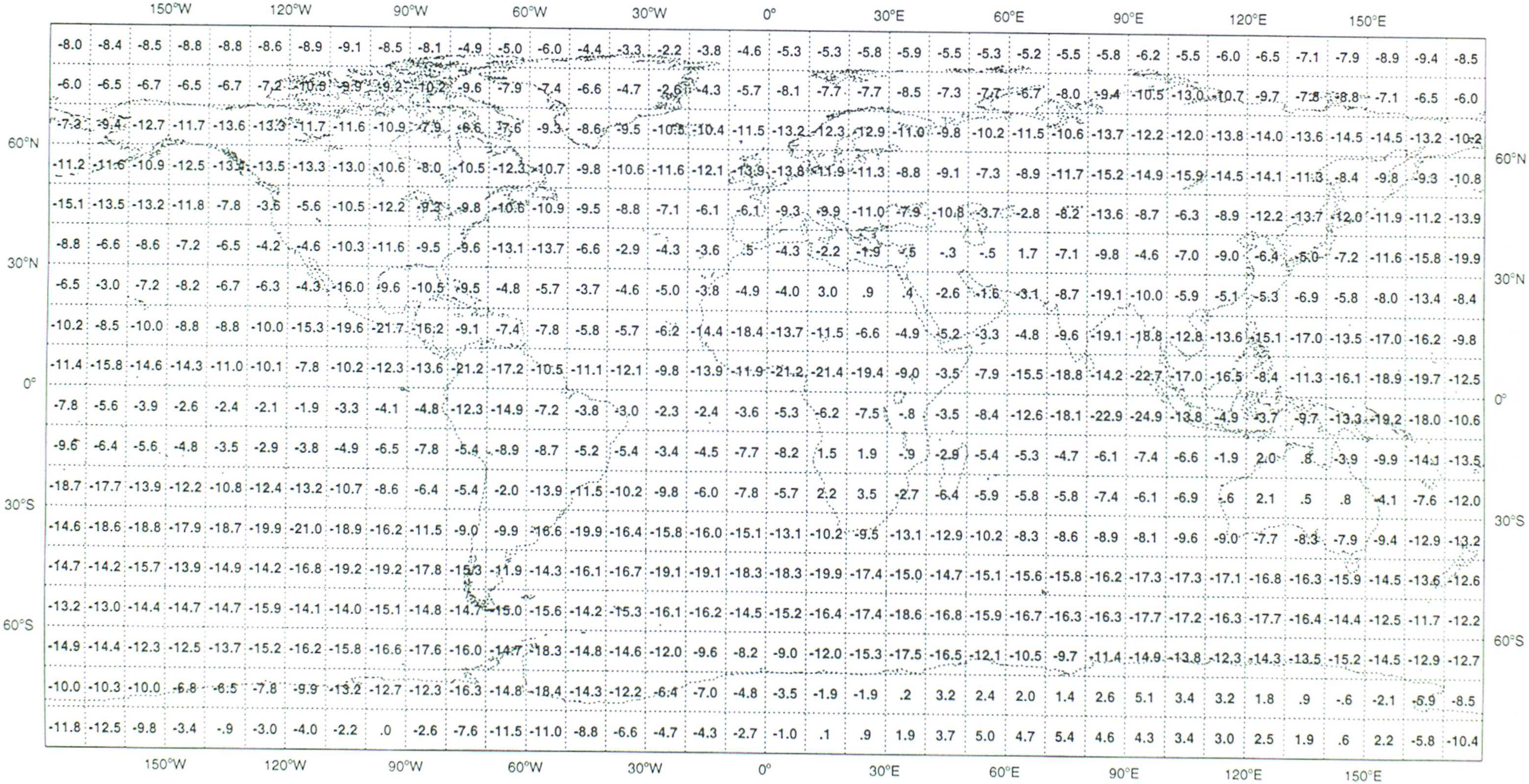
410	422	434	448	449	452	458	458	459	466	473	471	470	471	476	525	546	534	512	491	473	463	443	430	420	408	406	408	403	401	396	395	395	396	392	398
1191	1244	1282	1309	1297	1290	1308	1321	1394	1441	1498	1544	1647	1777	1868	1852	1729	1585	1426	1297	1195	1174	1153	1178	1197	1224	1248	1242	1202	1164	1123	1100	1089	1067	1091	1128
920	1063	1162	1179	1131	1096	1074	1082	1121	1163	1289	1490	1596	1650	1574	1433	1306	1199	1073	930	832	862	944	1065	1148	1169	1147	1107	1085	1110	1118	1107	1051	953	862	838
766	978	1119	1215	1189	1118	1080	1042	1039	1054	1043	1082	1120	1123	1148	1138	1111	1075	907	723	717	852	1013	1102	1106	1120	1055	952	1015	1062	1049	1063	994	882	776	706
696	832	1002	1107	1111	1127	1107	1069	1032	963	1031	1073	1047	1115	1105	1103	1113	977	773	660	729	943	1055	1067	1100	1057	878	786	888	944	885	827	731	702	663	665
921	1021	1039	1292	1183	1185	1175	798	887	889	987	1079	1013	1089	1091	1094	1098	900	699	620	783	973	1010	1081	1054	935	368	135	485	560	581	557	481	523	602	679
955	1042	1081	1253	1038	1125	1118	984	965	864	1088	1136	978	1150	1045	1066	1148	748	625	648	673	896	863	813	838	419	64	12	252	376	435	595	631	596	553	667
716	871	827	1050	951	874	771	615	667	650	947	1125	1127	1164	1066	1079	1067	721	540	603	478	759	825	739	555	229	43	30	146	168	273	351	469	424	514	514
731	786	799	892	891	868	744	753	780	823	1096	1263	1108	1044	1015	1033	937	658	541	612	734	1010	874	834	931	599	478	527	638	653	644	658	509	415	423	498
731	880	933	824	782	750	784	832	875	1068	1055	1017	1128	1024	1023	1052	925	671	593	819	1003	1054	753	757	879	775	703	762	1019	1038	1072	985	838	571	532	572
676	845	957	868	854	703	616	705	749	966	1038	1023	1173	962	943	869	712	618	588	832	1084	998	1027	855	669	575	671	848	887	816	981	876	1015	863	560	546
578	757	926	904	1085	960	923	1057	882	991	1057	1021	1145	1012	992	960	710	604	605	865	1034	905	1002	866	799	667	564	656	669	728	897	756	850	994	688	598
612	827	951	970	1037	1013	1056	1083	990	1054	1060	1050	1135	1005	1021	965	664	660	718	905	1095	993	1053	991	863	906	930	1017	1038	1002	1079	980	1005	1045	874	666
635	758	959	1003	1046	1048	1039	1051	1047	1042	1094	1088	1065	1085	1022	854	662	647	836	986	1034	1062	1083	998	957	977	1035	1111	1083	1095	1117	1039	1083	1113	980	751
713	744	884	1026	1068	1052	1085	1068	1064	1100	1100	1118	1128	1079	993	783	655	769	911	1022	1123	1104	1098	1033	979	1045	1092	1101	1133	1115	1118	1114	1101	1113	1055	854
888	816	840	928	1045	1107	1148	1174	1175	1189	1177	1159	1125	1028	925	807	778	908	1048	1142	1178	1171	1133	1052	1040	1121	1125	1142	1121	1151	1168	1133	1061	1072	1082	1016
1125	1080	1070	1065	1112	1137	1146	1195	1198	1193	1174	1134	1110	1055	1011	976	1005	1153	1232	1290	1287	1271	1199	1227	1243	1275	1259	1256	1103	1174	1208	1094	1084	1151	1072	1166
399	393	384	361	371	381	383	390	387	383	381	379	381	380	379	377	389	413	411	409	441	434	434	445	453	428	443	433	424	442	434	446	459	431	414	407

Figure 41. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2002
Channel: HIRS8 (Surface)
NOAA16, using all observations



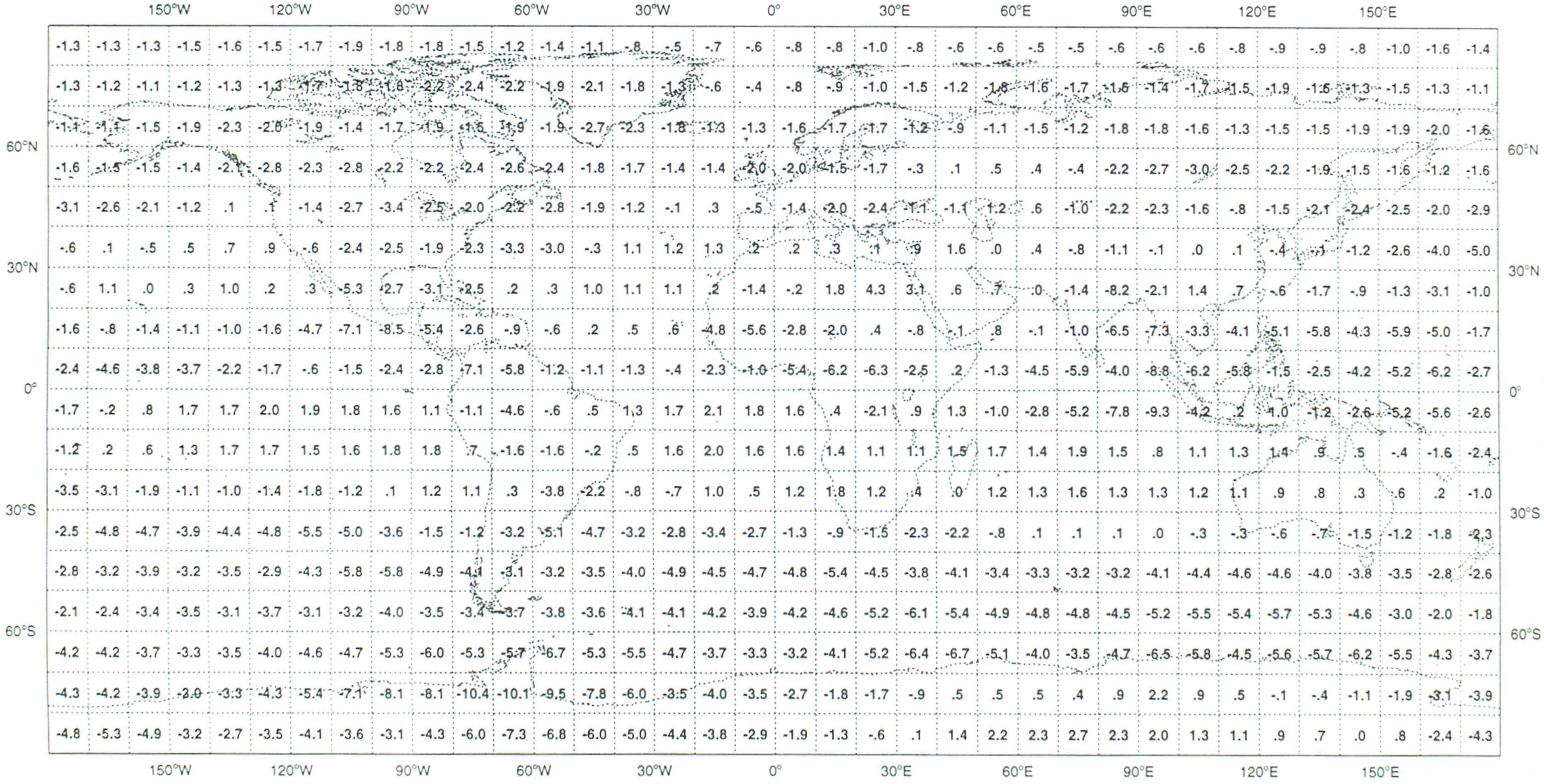
-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.4	-.4	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.5	-.4	-.4	-.4	-.4	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.3
-.8	-.7	-.6	-.5	-.5	-.5	-.5	-.6	-.5	-.5	-.6	-.6	-.7	-.7	-.8	-.8	-.8	-.7	-.7	-.8	-.8	-.8	-.7	-.8	-.8	-.9	-.9	-.9	-.9	-.9	-.9	-.8	-.8	-.8	-.8	-.8
-1.2	-1.1	-1.1	-1.1	-1.2	-1.2	-1.2	-1.3	-1.2	-1.1	-.9	-.9	-.8	-1.0	-1.0	-1.0	-.9	-1.0	-1.1	-1.2	-1.3	-1.3	-1.3	-1.2	-1.2	-1.2	-1.4	-1.5	-1.5	-1.6	-1.5	-1.4	-1.5	-1.4	-1.3	-1.3
-1.5	-1.6	-1.6	-1.5	-1.6	-1.7	-1.9	-2.2	-2.1	-2.0	-1.8	-1.8	-1.8	-1.7	-1.9	-1.9	-1.7	-1.8	-1.7	-1.7	-2.0	-1.8	-1.9	-1.6	-1.5	-1.6	-1.9	-2.2	-2.5	-2.4	-2.3	-2.1	-1.8	-1.7	-1.6	-1.6
-2.7	-2.6	-2.5	-2.3	-2.0	-2.2	-2.7	-3.2	-3.5	-3.1	-2.7	-2.7	-2.8	-2.7	-2.6	-2.4	-2.3	-2.3	-2.4	-2.4	-2.5	-2.3	-2.3	-2.0	-1.9	-2.2	-2.4	-2.6	-2.6	-2.5	-2.6	-2.8	-2.9	-2.7	-2.5	-2.7
-3.2	-2.9	-2.8	-2.6	-2.5	-2.8	-3.3	-3.7	-3.9	-3.7	-3.7	-3.8	-3.5	-2.8	-2.4	-2.5	-2.7	-2.6	-2.7	-2.6	-2.6	-2.7	-2.7	-2.7	-2.7	-2.9	-3.1	-2.7	-2.8	-2.9	-3.0	-3.3	-3.6	-3.8	-4.0	-4.4
-3.5	-2.9	-3.0	-3.1	-2.9	-3.3	-3.3	-4.6	-4.0	-4.2	-4.0	-3.2	-3.0	-2.8	-2.8	-3.0	-3.1	-3.0	-3.1	-3.0	-2.9	-3.2	-3.2	-3.3	-3.5	-4.0	-5.7	-3.8	-3.4	-3.5	-3.6	-4.1	-3.8	-4.0	-4.5	-3.7
-4.3	-4.2	-4.1	-4.0	-4.0	-4.3	-5.5	-6.1	-6.4	-5.3	-4.4	-3.8	-3.8	-3.4	-3.2	-3.2	-4.5	-4.5	-4.0	-4.3	-3.8	-4.1	-3.5	-3.4	-3.8	-4.2	-6.0	-5.7	-4.9	-5.5	-5.3	-5.9	-5.1	-5.8	-5.8	-4.2
-4.5	-5.3	-4.9	-4.8	-4.3	-4.2	-3.8	-4.1	-4.4	-4.5	-5.9	-5.2	-3.9	-3.9	-3.9	-3.7	-4.3	-3.8	-5.0	-5.3	-5.5	-4.2	-3.6	-4.5	-5.8	-6.0	-5.4	-6.8	-5.7	-5.3	-4.2	-4.5	-5.0	-5.5	-5.8	-4.6
-4.0	-3.7	-3.5	-3.3	-3.5	-3.4	-3.2	-3.2	-3.2	-3.2	-3.7	-4.4	-3.6	-3.2	-3.1	-3.1	-3.1	-3.1	-3.2	-3.5	-4.1	-3.3	-3.5	-4.4	-5.1	-5.6	-6.6	-7.0	-5.1	-3.8	-3.4	-3.7	-4.3	-5.4	-5.6	-4.3
-4.0	-3.6	-3.5	-3.2	-3.2	-3.1	-3.2	-3.2	-3.1	-3.1	-3.1	-3.6	-3.7	-3.3	-3.2	-3.1	-3.0	-3.2	-3.2	-3.1	-3.1	-3.1	-3.0	-3.1	-3.3	-3.3	-3.5	-3.7	-3.5	-3.2	-3.3	-3.3	-3.4	-3.7	-4.0	-4.1
-4.0	-3.9	-3.7	-3.3	-3.4	-3.3	-3.5	-3.5	-3.0	-2.7	-2.6	-2.9	-4.1	-3.6	-3.3	-3.2	-2.8	-2.9	-2.8	-2.6	-2.6	-2.6	-2.8	-2.6	-2.7	-2.6	-2.6	-2.7	-2.7	-2.8	-2.9	-2.7	-2.8	-2.7	-2.8	-3.2
-2.5	-3.1	-3.2	-2.9	-3.0	-3.0	-3.3	-3.5	-3.2	-2.7	-2.4	-2.8	-3.5	-3.3	-2.9	-3.0	-3.0	-2.8	-2.5	-2.4	-2.5	-2.4	-2.7	-2.4	-2.2	-2.1	-1.9	-2.0	-2.1	-2.1	-2.2	-2.2	-2.4	-2.1	-2.1	-2.4
-2.0	-2.2	-2.2	-2.1	-2.1	-2.0	-2.3	-2.8	-3.2	-3.0	-2.7	-2.5	-2.4	-2.4	-2.4	-2.6	-2.3	-2.2	-2.2	-2.4	-2.2	-2.1	-2.3	-2.3	-2.2	-2.0	-1.8	-1.8	-1.9	-1.9	-2.1	-2.1	-2.3	-2.3	-2.1	-2.0
-2.1	-2.2	-2.2	-2.3	-2.2	-2.3	-2.2	-2.3	-2.7	-2.7	-2.6	-2.7	-2.5	-2.5	-2.5	-2.2	-2.0	-1.8	-1.8	-1.8	-1.9	-2.3	-2.2	-2.1	-2.1	-2.1	-2.0	-2.0	-2.3	-2.4	-2.5	-2.7	-2.7	-2.5	-2.4	-2.2
-3.0	-2.8	-2.7	-2.7	-2.7	-2.8	-2.9	-3.0	-3.3	-3.5	-3.5	-3.7	-3.9	-3.5	-3.4	-3.2	-2.8	-2.7	-2.6	-2.6	-2.8	-3.1	-3.2	-2.9	-2.7	-2.6	-2.8	-3.3	-3.5	-3.4	-3.5	-3.7	-3.9	-3.7	-3.3	-3.0
-3.1	-3.0	-3.0	-2.0	-3.2	-3.4	-3.7	-4.2	-4.8	-5.0	-5.7	-6.0	-5.7	-5.5	-4.9	-4.3	-4.1	-3.8	-3.4	-3.1	-3.0	-2.8	-2.3	-2.4	-2.6	-2.6	-2.3	-2.0	-2.3	-2.5	-2.4	-2.5	-2.6	-2.7	-3.0	-3.1
-3.0	-3.1	-3.2	-3.3	-3.5	-3.7	-3.9	-4.0	-4.1	-4.4	-4.7	-5.1	-5.1	-4.9	-4.7	-4.6	-4.3	-4.0	-3.7	-3.5	-3.3	-3.0	-2.5	-2.2	-2.0	-2.0	-2.1	-2.2	-2.3	-2.4	-2.3	-2.4	-2.5	-2.6	-2.8	-2.9

Figure 42. ATOVS SD O-B brightness temperature differences (deg C). JULY 2002
Channel: HIRS8 (Surface)
NOAA16, using all observations



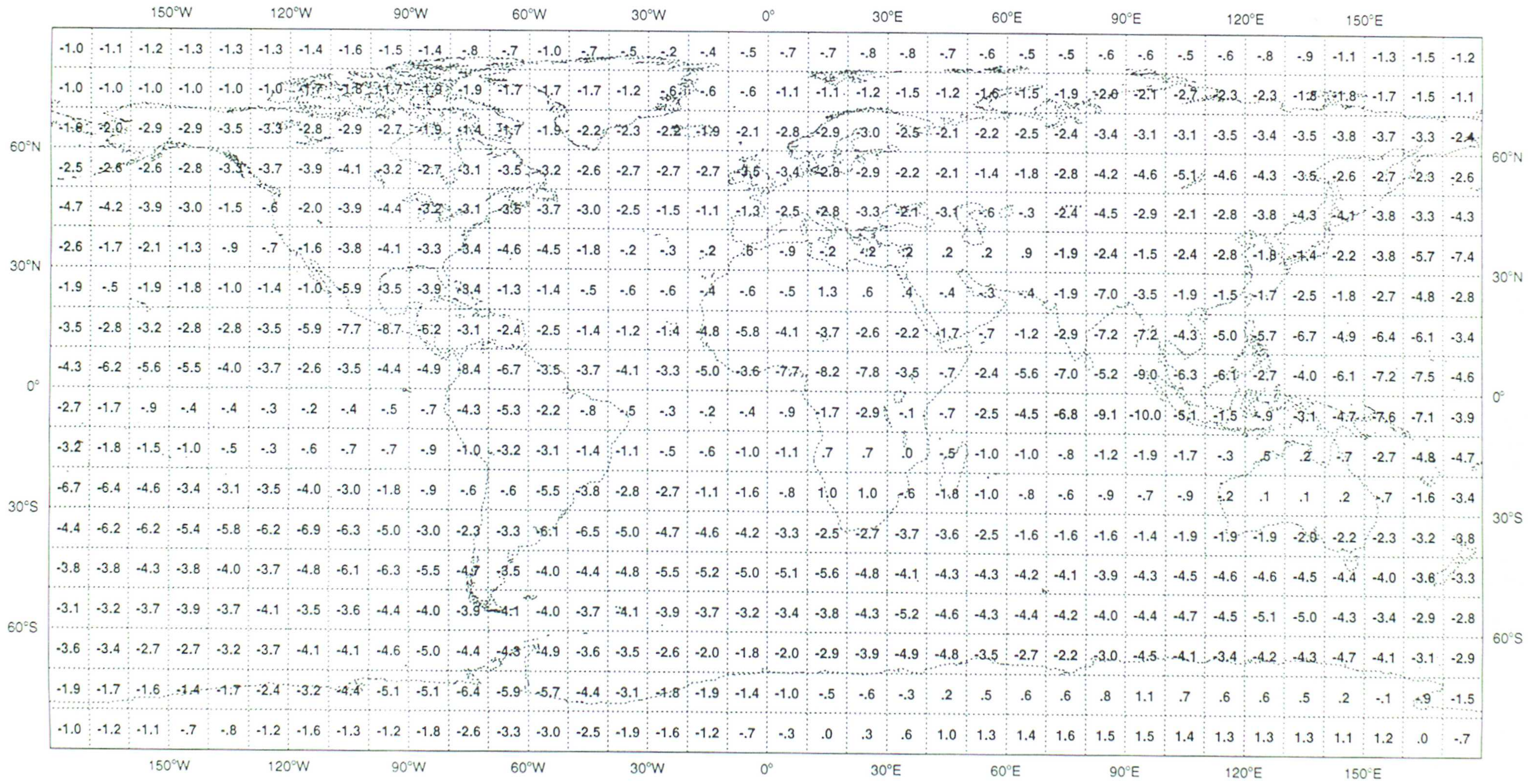
-8.0	-8.4	-8.5	-8.8	-8.8	-8.6	-8.9	-9.1	-8.5	-8.1	-4.9	-5.0	-6.0	-4.4	-3.3	-2.2	-3.8	-4.6	-5.3	-5.3	-5.8	-5.9	-5.5	-5.3	-5.2	-5.5	-5.8	-6.2	-5.5	-6.0	-6.5	-7.1	-7.9	-8.9	-9.4	-8.5
-6.0	-6.5	-6.7	-6.5	-6.7	-7.2	-10.5	-9.9	-9.2	-10.2	-9.6	-7.9	-7.4	-6.6	-4.7	-2.6	-4.3	-5.7	-8.1	-7.7	-7.7	-8.5	-7.3	-7.7	-6.7	-8.0	-9.4	-10.5	-13.0	-10.7	-9.7	-7.8	-8.8	-7.1	-6.5	-6.0
-7.3	-9.4	-12.7	-11.7	-13.6	-13.3	-11.7	-11.6	-10.9	-7.9	-6.6	-7.6	-9.3	-8.6	-9.5	-10.5	-10.4	-11.5	-13.2	-12.3	-12.9	-11.0	-9.8	-10.2	-11.5	-10.6	-13.7	-12.2	-12.0	-13.8	-14.0	-13.6	-14.5	-14.5	-13.2	-10.2
-11.2	-11.6	-10.9	-12.5	-13.4	-13.5	-13.3	-13.0	-10.6	-8.0	-10.5	-12.3	-10.7	-9.8	-10.6	-11.6	-12.1	-13.9	-13.8	-11.9	-11.3	-8.8	-9.1	-7.3	-8.9	-11.7	-15.2	-14.9	-15.9	-14.5	-14.1	-11.3	-8.4	-9.8	-9.3	-10.8
-15.1	-13.5	-13.2	-11.8	-7.8	-3.6	-5.6	-10.5	-12.2	-9.3	-9.8	-10.6	-10.9	-9.5	-8.8	-7.1	-6.1	-6.1	-9.3	-9.9	-11.0	-7.9	-10.8	-3.7	-2.8	-8.2	-13.6	-8.7	-6.3	-8.9	-12.2	-13.7	-12.0	-11.9	-11.2	-13.9
-8.8	-6.6	-8.6	-7.2	-6.5	-4.2	-4.6	-10.3	-11.6	-9.5	-9.6	-13.1	-13.7	-6.6	-2.9	-4.3	-3.6	.5	-4.3	-2.2	-1.9	-.5	-.3	-.5	1.7	-7.1	-9.8	-4.6	-7.0	-9.0	-6.4	-5.0	-7.2	-11.6	-15.8	-19.9
-6.5	-3.0	-7.2	-8.2	-6.7	-6.3	-4.3	-16.0	-9.6	-10.5	-9.5	-4.8	-5.7	-3.7	-4.6	-5.0	-3.8	-4.9	-4.0	3.0	.9	.4	-2.6	-1.6	-3.1	-8.7	-19.1	-10.0	-5.9	-5.1	-5.3	-6.9	-5.8	-8.0	-13.4	-8.4
-10.2	-8.5	-10.0	-8.8	-8.8	-10.0	-15.3	-19.6	-21.7	-16.2	-9.1	-7.4	-7.8	-5.8	-5.7	-6.2	-14.4	-18.4	-13.7	-11.5	-6.6	-4.9	-5.2	-3.3	-4.8	-9.6	-19.1	-18.8	-12.8	-13.6	-15.1	-17.0	-13.5	-17.0	-16.2	-9.8
-11.4	-15.8	-14.6	-14.3	-11.0	-10.1	-7.8	-10.2	-12.3	-13.6	-21.2	-17.2	-10.5	-11.1	-12.1	-9.8	-13.9	-11.9	-21.2	-21.4	-19.4	-9.0	-3.5	-7.9	-15.5	-18.8	-14.2	-22.7	-17.0	-16.5	-8.4	-11.3	-16.1	-18.9	-19.7	-12.5
-7.8	-5.6	-3.9	-2.6	-2.4	-2.1	-1.9	-3.3	-4.1	-4.8	-12.3	-14.9	-7.2	-3.8	-3.0	-2.3	-2.4	-3.6	-5.3	-6.2	-7.5	-.8	-3.5	-8.4	-12.6	-18.1	-22.9	-24.9	-13.8	-4.9	-3.7	-9.7	-13.3	-19.2	-18.0	-10.6
-9.6	-6.4	-5.6	-4.8	-3.5	-2.9	-3.8	-4.9	-6.5	-7.8	-5.4	-8.9	-8.7	-5.2	-5.4	-3.4	-4.5	-7.7	-8.2	1.5	1.9	-.9	-2.9	-5.4	-5.3	-4.7	-6.1	-7.4	-6.6	-1.9	2.0	.8	-3.9	-9.9	-14.1	-13.5
-18.7	-17.7	-13.9	-12.2	-10.8	-12.4	-13.2	-10.7	-8.6	-6.4	-5.4	-2.0	-13.9	-11.5	-10.2	-9.8	-6.0	-7.8	-5.7	2.2	3.5	-2.7	-6.4	-5.9	-5.8	-5.8	-7.4	-6.1	-6.9	-.6	2.1	.5	.8	-4.1	-7.6	-12.0
-14.6	-18.6	-18.8	-17.9	-18.7	-19.9	-21.0	-18.9	-16.2	-11.5	-9.0	-9.9	-16.6	-19.9	-16.4	-15.8	-16.0	-15.1	-13.1	-10.2	-9.5	-13.1	-12.9	-10.2	-8.3	-8.6	-8.9	-8.1	-9.6	-9.0	-7.7	-8.3	-7.9	-9.4	-12.9	-13.2
-14.7	-14.2	-15.7	-13.9	-14.9	-14.2	-16.8	-19.2	-19.2	-17.8	-15.3	-11.9	-14.3	-16.1	-16.7	-19.1	-19.1	-18.3	-18.3	-19.9	-17.4	-15.0	-14.7	-15.1	-15.6	-15.8	-16.2	-17.3	-17.3	-17.1	-16.8	-16.3	-15.9	-14.5	-13.6	-12.6
-13.2	-13.0	-14.4	-14.7	-14.7	-15.9	-14.1	-14.0	-15.1	-14.8	-14.7	-15.0	-15.6	-14.2	-15.3	-16.1	-16.2	-14.5	-15.2	-16.4	-17.4	-18.6	-16.8	-15.9	-16.7	-16.3	-16.3	-17.7	-17.2	-16.3	-17.7	-16.4	-14.4	-12.5	-11.7	-12.2
-14.9	-14.4	-12.3	-12.5	-13.7	-15.2	-16.2	-15.8	-16.6	-17.6	-16.0	-14.7	-18.3	-14.8	-14.6	-12.0	-9.6	-8.2	-9.0	-12.0	-15.3	-17.5	-16.5	-12.1	-10.5	-9.7	-11.4	-14.9	-13.8	-12.3	-14.3	-13.5	-15.2	-14.5	-12.9	-12.7
-10.0	-10.3	-10.0	-6.8	-6.5	-7.8	-9.9	-13.2	-12.7	-12.3	-16.3	-14.8	-18.4	-14.3	-12.2	-6.4	-7.0	-4.8	-3.5	-1.9	-1.9	.2	3.2	2.4	2.0	1.4	2.6	5.1	3.4	3.2	1.8	.9	-.6	-2.1	-6.9	-8.5
-11.8	-12.5	-9.8	-3.4	-.9	-3.0	-4.0	-2.2	.0	-2.6	-7.6	-11.5	-11.0	-8.8	-6.6	-4.7	-4.3	-2.7	-1.0	.1	.9	1.9	3.7	5.0	4.7	5.4	4.6	4.3	3.4	3.0	2.5	1.9	.6	2.2	-5.8	-10.4

Figure 43. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2002
Channel: HIRS15 (700 hPa)
NOAA16, using all observations



-1.3	-1.3	-1.3	-1.5	-1.6	-1.5	-1.7	-1.9	-1.8	-1.8	-1.5	-1.2	-1.4	-1.1	-.8	-.5	-.7	-.6	-.8	-.8	-1.0	-.8	-.6	-.6	-.5	-.5	-.6	-.6	-.6	-.8	-.9	-.9	-.8	-1.0	-1.6	-1.4
-1.3	-1.2	-1.1	-1.2	-1.3	-1.3	-1.7	-1.8	-1.8	-2.2	-2.4	-2.2	-1.9	-2.1	-1.8	-1.3	-.6	-.4	-.8	-.9	-1.0	-1.5	-1.2	-1.8	-1.6	-1.7	-1.6	-1.4	-1.7	-1.5	-1.9	-1.6	-1.3	-1.5	-1.3	-1.1
-1.1	-1.1	-1.5	-1.9	-2.3	-2.0	-1.9	-1.4	-1.7	-1.9	-1.6	-1.9	-1.9	-2.7	-2.3	-1.8	-1.3	-1.3	-1.6	-1.7	-1.7	-1.2	-.9	-1.1	-1.5	-1.2	-1.8	-1.8	-1.6	-1.3	-1.5	-1.5	-1.9	-1.9	-2.0	-1.6
-1.6	-1.5	-1.5	-1.4	-2.1	-2.8	-2.3	-2.8	-2.2	-2.2	-2.4	-2.6	-2.4	-1.8	-1.7	-1.4	-1.4	-2.0	-2.0	-1.5	-1.7	-.3	.1	.5	.4	-.4	-2.2	-2.7	-3.0	-2.5	-2.2	-1.9	-1.5	-1.6	-1.2	-1.6
-3.1	-2.6	-2.1	-1.2	.1	.1	-1.4	-2.7	-3.4	-2.5	-2.0	-2.2	-2.8	-1.9	-1.2	-.1	.3	-.5	-1.4	-2.0	-2.4	-1.1	-1.1	-1.2	.6	-1.0	-2.2	-2.3	-1.6	-.8	-1.5	-2.1	-2.4	-2.5	-2.0	-2.9
-.6	.1	-.5	.5	.7	.9	-.6	-2.4	-2.5	-1.9	-2.3	-3.3	-3.0	-.3	1.1	1.2	1.3	.2	.2	.3	.1	.9	1.6	.0	.4	-.8	-1.1	-.1	.0	.1	-.4	-.1	-1.2	-2.6	-4.0	-5.0
-.6	1.1	.0	.3	1.0	.2	.3	-5.3	-2.7	-3.1	-2.5	.2	.3	1.0	1.1	1.1	.2	-1.4	-.2	1.8	4.3	3.1	.6	.7	.0	-1.4	-8.2	-2.1	1.4	.7	-.6	-1.7	-.9	-1.3	-3.1	-1.0
-1.6	-.8	-1.4	-1.1	-1.0	-1.6	-4.7	-7.1	-8.5	-5.4	-2.6	-.9	-.6	.2	.5	.6	-4.8	-5.6	-2.8	-2.0	.4	-.8	-.1	.8	-.1	-1.0	-6.5	-7.3	-3.3	-4.1	-5.1	-5.8	-4.3	-5.9	-5.0	-1.7
-2.4	-4.6	-3.8	-3.7	-2.2	-1.7	-.6	-1.5	-2.4	-2.8	-7.1	-5.8	-1.2	-1.1	-1.3	-.4	-2.3	-1.0	-5.4	-6.2	-6.3	-2.5	.2	-1.3	-4.5	-5.9	-4.0	-8.8	-6.2	-5.8	-1.5	-2.5	-4.2	-5.2	-6.2	-2.7
-1.7	-.2	.8	1.7	1.7	2.0	1.9	1.8	1.6	1.1	-1.1	-4.6	-.6	.5	1.3	1.7	2.1	1.8	1.6	.4	-2.1	.9	1.3	-1.0	-2.8	-5.2	-7.8	-9.3	-4.2	.2	-1.0	-1.2	-2.6	-5.2	-5.6	-2.6
-1.2	.2	.6	1.3	1.7	1.7	1.5	1.6	1.8	1.8	.7	-1.6	-1.6	-.2	.5	1.6	2.0	1.6	1.6	1.4	1.1	1.1	1.5	1.7	1.4	1.9	1.5	.8	1.1	1.3	1.4	.9	.5	-.4	-1.6	-2.4
-3.5	-3.1	-1.9	-1.1	-1.0	-1.4	-1.8	-1.2	.1	1.2	1.1	.3	-3.8	-2.2	-.8	-.7	1.0	.5	1.2	1.8	1.2	.4	.0	1.2	1.3	1.6	1.3	1.3	1.2	1.1	.9	.8	.3	.6	.2	-1.0
-2.5	-4.8	-4.7	-3.9	-4.4	-4.8	-5.5	-5.0	-3.6	-1.5	-1.2	-3.2	-5.1	-4.7	-3.2	-2.8	-3.4	-2.7	-1.3	-.9	-1.5	-2.3	-2.2	-.8	.1	.1	.1	.0	-.3	-.3	-.6	-.7	-1.5	-1.2	-1.8	-2.3
-2.8	-3.2	-3.9	-3.2	-3.5	-2.9	-4.3	-5.8	-5.8	-4.9	-4.1	-3.1	-3.2	-3.5	-4.0	-4.9	-4.5	-4.7	-4.8	-5.4	-4.5	-3.8	-4.1	-3.4	-3.3	-3.2	-3.2	-4.1	-4.4	-4.6	-4.6	-4.0	-3.8	-3.5	-2.8	-2.6
-2.1	-2.4	-3.4	-3.5	-3.1	-3.7	-3.1	-3.2	-4.0	-3.5	-3.4	-3.7	-3.8	-3.6	-4.1	-4.1	-4.2	-3.9	-4.2	-4.6	-5.2	-6.1	-5.4	-4.9	-4.8	-4.8	-4.5	-5.2	-5.5	-5.4	-5.7	-5.3	-4.6	-3.0	-2.0	-1.8
-4.2	-4.2	-3.7	-3.3	-3.5	-4.0	-4.6	-4.7	-5.3	-6.0	-5.3	-5.7	-6.7	-5.3	-5.5	-4.7	-3.7	-3.3	-3.2	-4.1	-5.2	-6.4	-6.7	-5.1	-4.0	-3.5	-4.7	-6.5	-5.8	-4.5	-5.6	-5.7	-6.2	-5.5	-4.3	-3.7
-4.3	-4.2	-3.9	-3.0	-3.3	-4.3	-5.4	-7.1	-8.1	-8.1	-10.4	-10.1	-9.5	-7.8	-6.0	-3.5	-4.0	-3.5	-2.7	-1.8	-1.7	-.9	.5	.5	.5	.4	.9	2.2	.9	.5	-.1	-.4	-1.1	-1.9	-3.1	-3.9
-4.8	-5.3	-4.9	-3.2	-2.7	-3.5	-4.1	-3.6	-3.1	-4.3	-6.0	-7.3	-6.8	-6.0	-5.0	-4.4	-3.8	-2.9	-1.9	-1.3	-.6	.1	1.4	2.2	2.3	2.7	2.3	2.0	1.3	1.1	.9	.7	.0	.8	-2.4	-4.3

Figure 44. ATOVS SD O-B brightness temperature differences (deg C). JULY 2002
Channel: HIRS15 (700 hPa)
NOAA16, using all observations



-1.0	-1.1	-1.2	-1.3	-1.3	-1.3	-1.4	-1.6	-1.5	-1.4	-.8	-.7	-1.0	-.7	-.5	-.2	-.4	-.5	-.7	-.7	-.8	-.8	-.7	-.6	-.5	-.5	-.6	-.6	-.5	-.6	-.8	-.9	-1.1	-1.3	-1.5	-1.2
-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.7	-1.8	-1.7	-1.9	-1.9	-1.7	-1.7	-1.7	-1.2	-.6	-.6	-.6	-1.1	-1.1	-1.2	-1.5	-1.2	-1.6	-1.5	-1.9	-2.0	-2.1	-2.7	-2.3	-2.3	-1.8	-1.8	-1.7	-1.5	-1.1
-1.8	-2.0	-2.9	-2.9	-3.5	-3.3	-2.8	-2.9	-2.7	-1.9	-1.4	-1.7	-1.9	-2.2	-2.3	-2.2	-1.9	-2.1	-2.8	-2.9	-3.0	-2.5	-2.1	-2.2	-2.5	-2.4	-3.4	-3.1	-3.1	-3.5	-3.4	-3.5	-3.8	-3.7	-3.3	-2.4
-2.5	-2.6	-2.6	-2.8	-3.3	-3.7	-3.9	-4.1	-3.2	-2.7	-3.1	-3.5	-3.2	-2.6	-2.7	-2.7	-2.7	-3.5	-3.4	-2.8	-2.9	-2.2	-2.1	-1.4	-1.8	-2.8	-4.2	-4.6	-5.1	-4.6	-4.3	-3.5	-2.6	-2.7	-2.3	-2.6
-4.7	-4.2	-3.9	-3.0	-1.5	-.6	-2.0	-3.9	-4.4	-3.2	-3.1	-3.5	-3.7	-3.0	-2.5	-1.5	-1.1	-1.3	-2.5	-2.8	-3.3	-2.1	-3.1	-.6	-.3	-2.4	-4.5	-2.9	-2.1	-2.8	-3.8	-4.3	-4.1	-3.8	-3.3	-4.3
-2.6	-1.7	-2.1	-1.3	-.9	-.7	-1.6	-3.8	-4.1	-3.3	-3.4	-4.6	-4.5	-1.8	-.2	-.3	-.2	.6	-.9	-.2	.2	.2	.2	.2	.9	-1.9	-2.4	-1.5	-2.4	-2.8	-1.8	-1.4	-2.2	-3.8	-5.7	-7.4
-1.9	-.5	-1.9	-1.8	-1.0	-1.4	-1.0	-5.9	-3.5	-3.9	-3.4	-1.3	-1.4	-.5	-.6	-.6	-.4	-.6	-.5	1.3	.6	.4	-.4	-.3	-.4	-1.9	-7.0	-3.5	-1.9	-1.5	-1.7	-2.5	-1.8	-2.7	-4.8	-2.8
-3.5	-2.8	-3.2	-2.8	-2.8	-3.5	-5.9	-7.7	-8.7	-6.2	-3.1	-2.4	-2.5	-1.4	-1.2	-1.4	-4.8	-5.8	-4.1	-3.7	-2.6	-2.2	-1.7	-.7	-1.2	-2.9	-7.2	-7.2	-4.3	-5.0	-5.7	-6.7	-4.9	-6.4	-6.1	-3.4
-4.3	-6.2	-5.6	-5.5	-4.0	-3.7	-2.6	-3.5	-4.4	-4.9	-8.4	-6.7	-3.5	-3.7	-4.1	-3.3	-5.0	-3.6	-7.7	-8.2	-7.8	-3.5	-.7	-2.4	-5.6	-7.0	-5.2	-9.0	-6.3	-6.1	-2.7	-4.0	-6.1	-7.2	-7.5	-4.6
-2.7	-1.7	-.9	-.4	-.4	-.3	-.2	-.4	-.5	-.7	-4.3	-5.3	-2.2	-.8	-.5	-.3	-.2	-.4	-.9	-1.7	-2.9	-.1	-.7	-2.5	-4.5	-6.8	-9.1	-10.0	-5.1	-1.5	-.9	-3.1	-4.7	-7.6	-7.1	-3.9
-3.2	-1.8	-1.5	-1.0	-.5	-.3	-.6	-.7	-.7	-.9	-1.0	-3.2	-3.1	-1.4	-1.1	-.5	-.6	-1.0	-1.1	.7	.7	.0	-.5	-1.0	-1.0	-.8	-1.2	-1.9	-1.7	-.3	.5	.2	-.7	-2.7	-4.8	-4.7
-6.7	-6.4	-4.6	-3.4	-3.1	-3.5	-4.0	-3.0	-1.8	-.9	-.6	-.6	-5.5	-3.8	-2.8	-2.7	-1.1	-1.6	-.8	1.0	1.0	-.6	-1.8	-1.0	-.8	-.6	-.9	-.7	-.9	-.2	.1	.1	.2	-.7	-1.6	-3.4
-4.4	-6.2	-6.2	-5.4	-5.8	-6.2	-6.9	-6.3	-5.0	-3.0	-2.3	-3.3	-6.1	-6.5	-5.0	-4.7	-4.6	-4.2	-3.3	-2.5	-2.7	-3.7	-3.6	-2.5	-1.6	-1.6	-1.6	-1.4	-1.9	-1.9	-1.9	-2.0	-2.2	-2.3	-3.2	-3.8
-3.8	-3.8	-4.3	-3.8	-4.0	-3.7	-4.8	-6.1	-6.3	-5.5	-4.7	-3.5	-4.0	-4.4	-4.8	-5.5	-5.2	-5.0	-5.1	-5.6	-4.8	-4.1	-4.3	-4.3	-4.2	-4.1	-3.9	-4.3	-4.5	-4.6	-4.6	-4.5	-4.4	-4.0	-3.6	-3.3
-3.1	-3.2	-3.7	-3.9	-3.7	-4.1	-3.5	-3.6	-4.4	-4.0	-3.9	-4.1	-4.0	-3.7	-4.1	-3.9	-3.7	-3.2	-3.4	-3.8	-4.3	-5.2	-4.6	-4.3	-4.4	-4.2	-4.0	-4.4	-4.7	-4.5	-5.1	-5.0	-4.3	-3.4	-2.9	-2.8
-3.6	-3.4	-2.7	-2.7	-3.2	-3.7	-4.1	-4.1	-4.6	-5.0	-4.4	-4.3	-4.9	-3.6	-3.5	-2.6	-2.0	-1.8	-2.0	-2.9	-3.9	-4.9	-4.8	-3.5	-2.7	-2.2	-3.0	-4.5	-4.1	-3.4	-4.2	-4.3	-4.7	-4.1	-3.1	-2.9
-1.9	-1.7	-1.6	-1.4	-1.7	-2.4	-3.2	-4.4	-5.1	-5.1	-6.4	-5.9	-5.7	-4.4	-3.1	-1.8	-1.9	-1.4	-1.0	-.5	-.6	-.3	.2	.5	.6	.6	.8	1.1	.7	.6	.6	.5	.2	-.1	-.9	-1.5
-1.0	-1.2	-1.1	-.7	-.8	-1.2	-1.6	-1.3	-1.2	-1.8	-2.6	-3.3	-3.0	-2.5	-1.9	-1.6	-1.2	-.7	-.3	.0	.3	.6	1.0	1.3	1.4	1.6	1.5	1.5	1.4	1.3	1.3	1.3	1.1	1.2	.0	-.7

Figure 45. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2002
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations

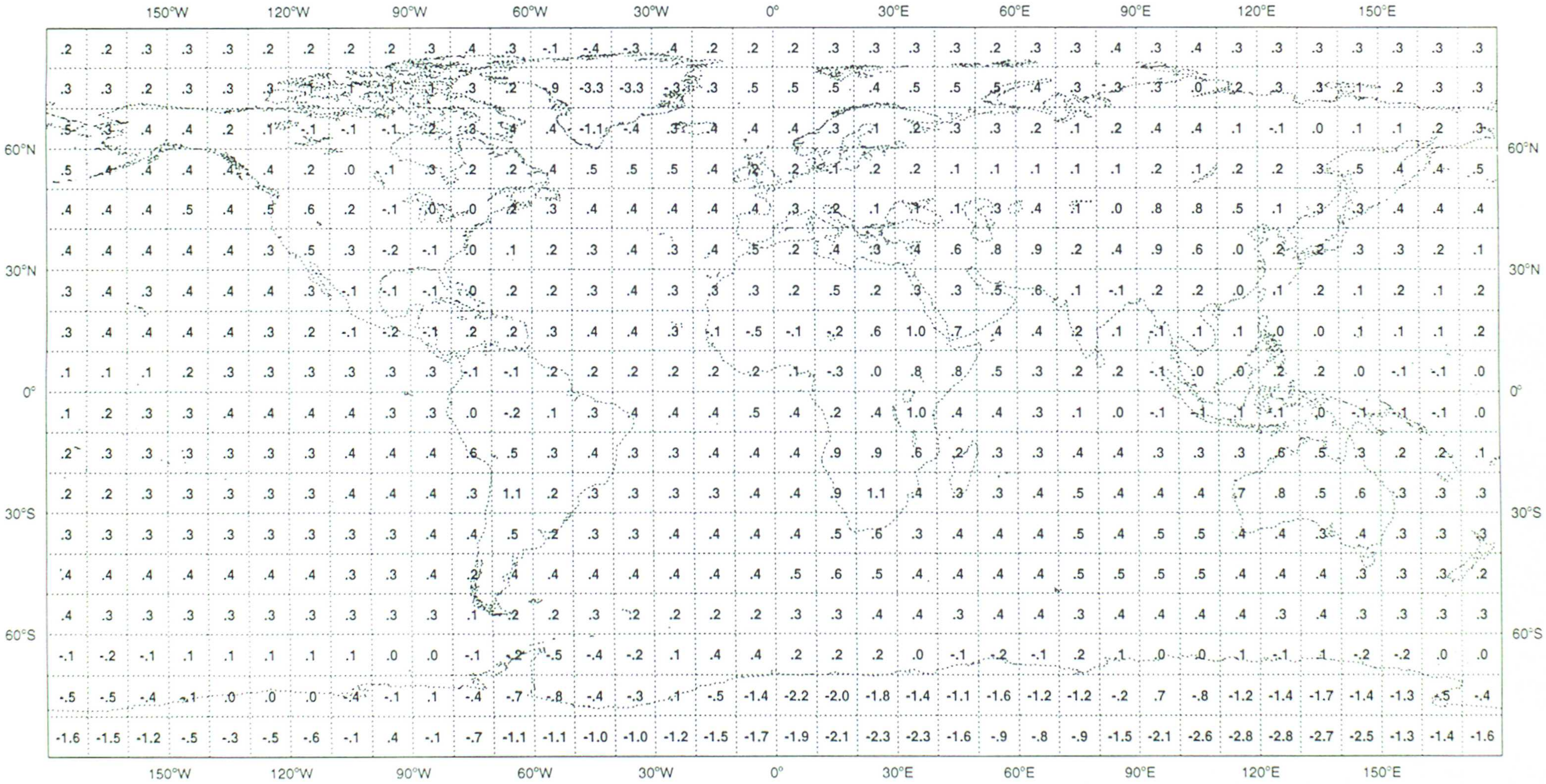

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.2 .2 .3 .3 .3 .2 .2 .2 .2 .3 .4 .3 -.1 -.4 -.3 .4 .2 .2 .2 .3 .3 .3 .3 .2 .3 .3 .4 .3 .4 .3 .3 .3 .3 .3 .3 .3
.3 .3 .2 .3 .3 .3 .1 .1 .1 .1 .3 .2 .9 -3.3 -3.3 .3 .3 .5 .5 .5 .4 .5 .5 .5 .4 .3 .3 .3 .0 .2 .3 .3 .1 .2 .3 .3
.5 .3 .4 .4 .2 .1 -.1 -.1 -.1 .2 .3 .4 .4 -1.1 -.4 .3 .4 .4 .4 .3 .1 .2 .3 .3 .2 .1 .2 .4 .4 .1 -.1 .0 .1 .1 .2 .3
.5 .4 .4 .4 .4 .4 .2 .0 .1 .3 .2 .2 .4 .5 .5 .5 .4 .2 .2 .1 .2 .2 .1 .1 .1 .1 .1 .2 .1 .2 .2 .3 .5 .4 .4 .5
.4 .4 .4 .5 .4 .5 .6 .2 -.1 .0 .0 .2 .3 .4 .4 .4 .4 .4 .3 .2 .1 .1 .1 .3 .4 .1 .0 .8 .8 .5 .1 .3 .3 .4 .4 .4
.4 .4 .4 .4 .4 .3 .5 .3 -.2 -.1 .0 .1 .2 .3 .4 .3 .4 .5 .2 .4 .3 .4 .6 .8 .9 .2 .4 .9 .6 .0 .2 .2 .3 .3 .2 .1
.3 .4 .3 .4 .4 .4 .3 -.1 -.1 -.1 .0 .2 .2 .3 .4 .3 .3 .3 .2 .5 .2 .3 .3 .5 .6 .1 -.1 .2 .2 .0 .1 .2 .1 .2 .1 .2
.3 .4 .4 .4 .4 .3 .2 -.1 -.2 -.1 .2 .2 .3 .4 .4 .3 -.1 -.5 -.1 -.2 .6 1.0 .7 .4 .4 .2 .1 -.1 .1 .1 .0 .0 .1 .1 .1 .2
.1 .1 .1 .2 .3 .3 .3 .3 .3 .3 -.1 -.1 .2 .2 .2 .2 .2 .2 .1 -.3 .0 .8 .8 .5 .3 .2 .2 -.1 .0 .0 .2 .2 .0 -.1 -.1 .0
.1 .2 .3 .3 .4 .4 .4 .4 .3 .3 .0 -.2 .1 .3 .4 .4 .4 .5 .4 .2 .4 1.0 .4 .4 .3 .1 .0 -.1 -.1 .1 .1 .0 -.1 -.1 -.1 .0
.2 .3 .3 .3 .3 .3 .3 .4 .4 .4 .6 .5 .3 .4 .3 .3 .4 .4 .4 .9 .9 .6 .2 .3 .3 .4 .4 .3 .3 .3 .6 .5 .3 .2 .2 .1
.2 .2 .3 .3 .3 .3 .3 .4 .4 .4 .3 1.1 .2 .3 .3 .3 .3 .4 .4 .9 1.1 .4 .3 .3 .4 .5 .4 .4 .4 .7 .8 .5 .6 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .5 .2 .3 .3 .4 .4 .4 .4 .5 .6 .3 .4 .4 .4 .5 .4 .5 .5 .4 .4 .3 .4 .3 .3 .3
.4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .2 .4 .4 .4 .4 .4 .4 .4 .5 .6 .5 .4 .4 .4 .4 .5 .5 .5 .5 .4 .4 .4 .3 .3 .3 .2
.4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .1 .2 .2 .3 .2 .2 .2 .2 .3 .3 .4 .4 .3 .4 .4 .3 .4 .4 .4 .4 .3 .4 .3 .3 .3 .3
-.1 -.2 -.1 .1 .1 .1 .1 .1 .0 .0 -.1 .2 -.5 -.4 -.2 .1 .4 .4 .2 .2 .2 .0 -.1 -.2 -.1 .2 .1 .0 .0 .1 -.1 .1 -.2 -.2 .0 .0
-.5 -.5 -.4 .1 .0 .0 .0 -.4 -.1 .1 -.4 -.7 -.8 -.4 -.3 .1 -.5 -1.4 -2.2 -2.0 -1.8 -1.4 -1.1 -1.6 -1.2 -1.2 -.2 .7 -.8 -1.2 -1.4 -1.7 -1.4 -1.3 .5 -.4
-1.6 -1.5 -1.2 -.5 -.3 -.5 -.6 -.1 .4 -.1 -.7 -1.1 -1.1 -1.0 -1.0 -1.2 -1.5 -1.7 -1.9 -2.1 -2.3 -2.3 -1.6 -.9 -.8 -.9 -1.5 -2.1 -2.6 -2.8 -2.8 -2.7 -2.5 -1.3 -1.4 -1.6

Figure 46. ATOVS SD O-B brightness temperature differences (deg C). JULY 2002
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations

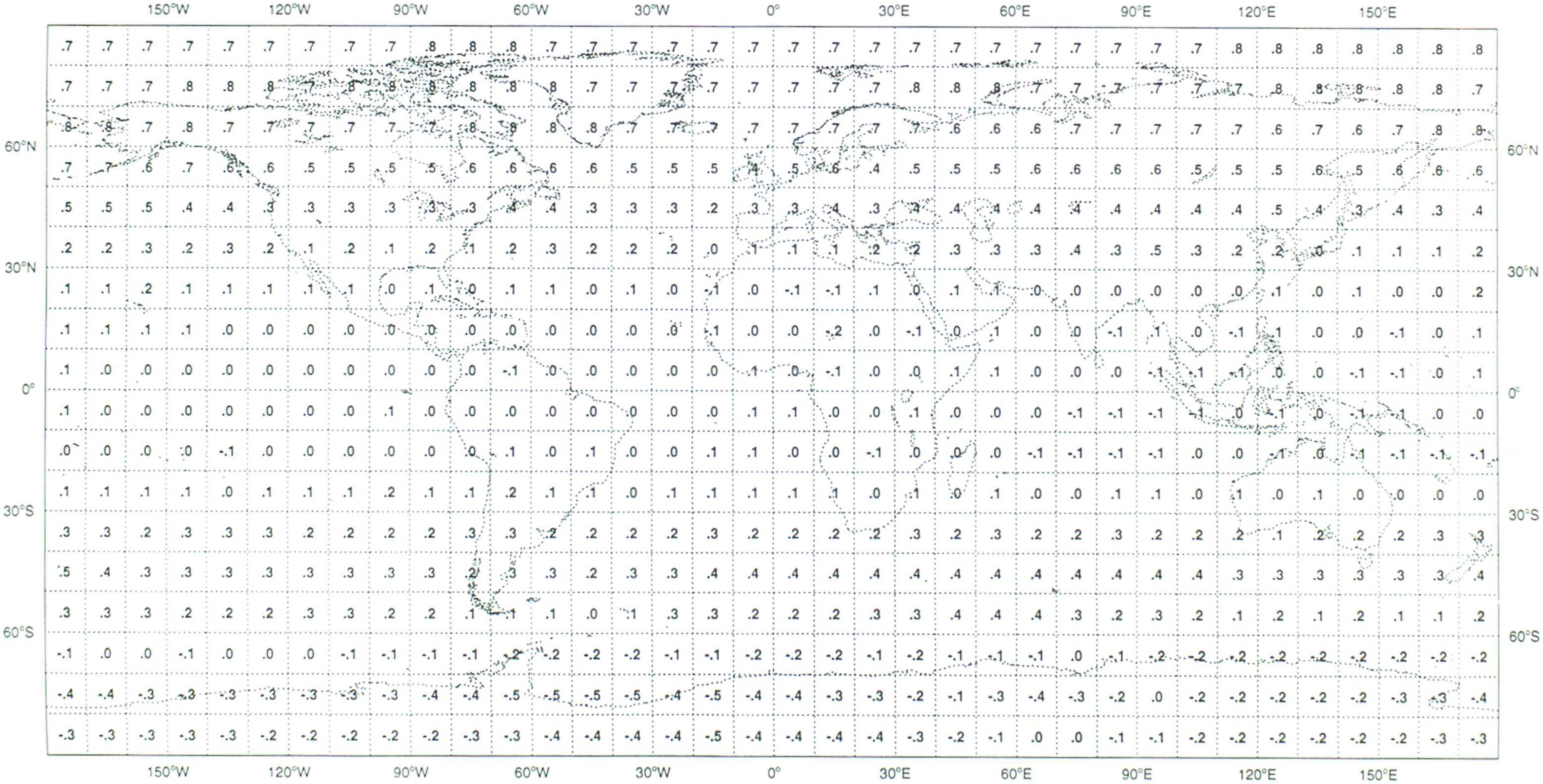
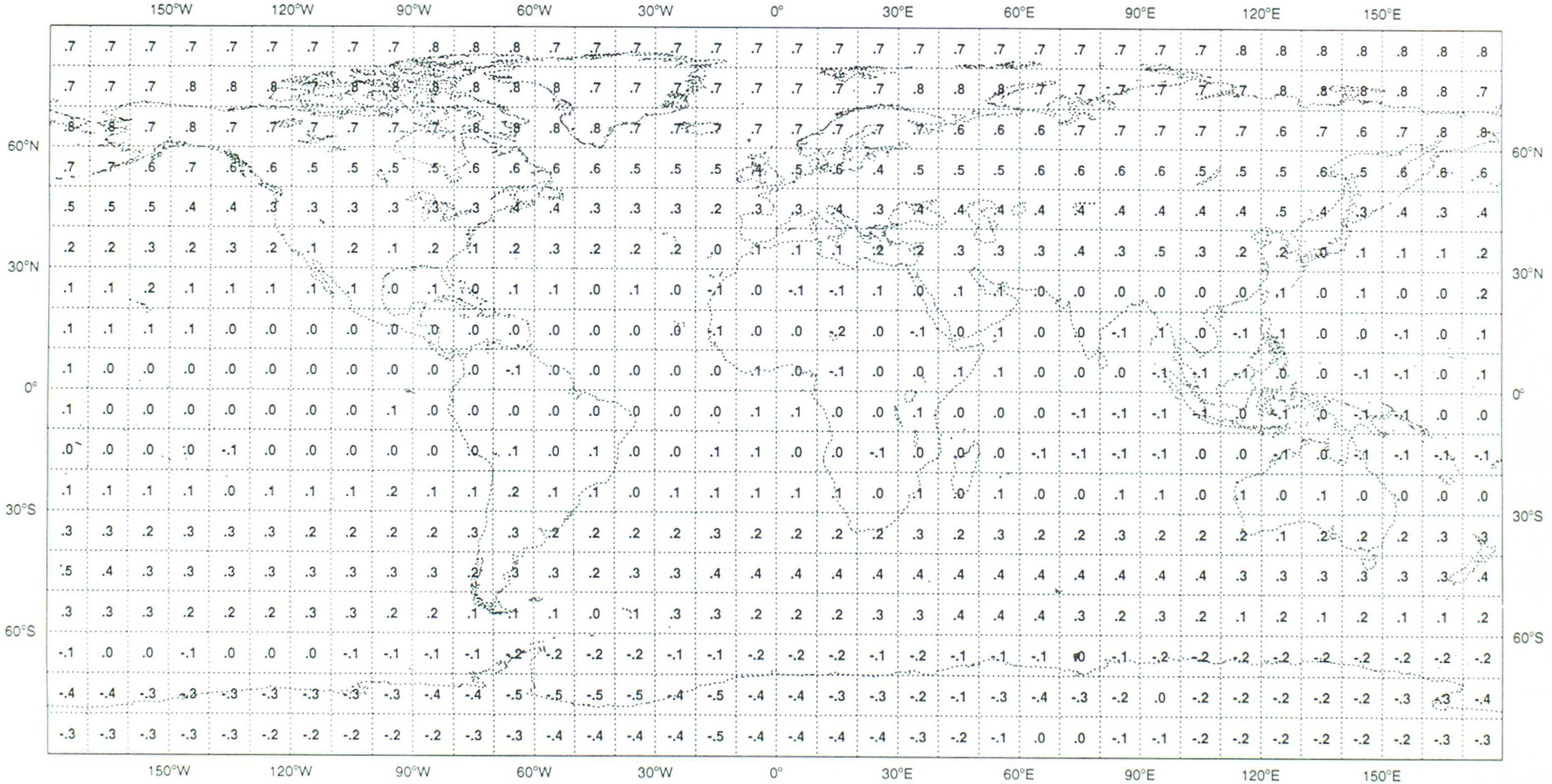
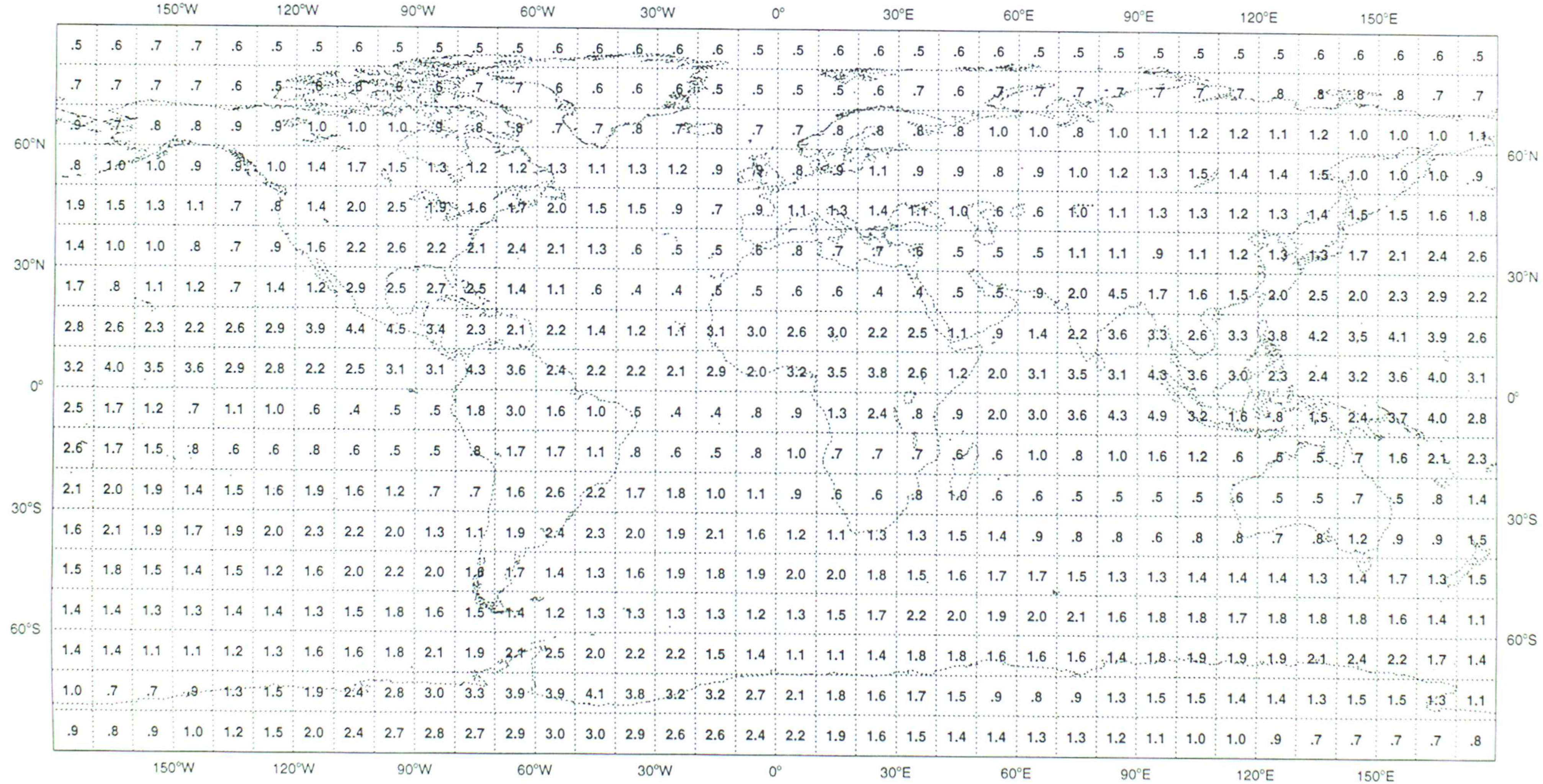

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.7 .7 .7 .7 .7 .7 .7 .7 .7 .8 .8 .8 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .8 .8 .8 .8 .8 .8 .8
.7 .7 .7 .8 .8 .8 .7 .8 .8 .8 .8 .8 .8 .7 .7 .7 .7 .7 .7 .7 .7 .8 .8 .8 .7 .7 .7 .7 .7 .7 .8 .8 .8 .8 .8 .7
.8 .8 .7 .8 .7 .7 .7 .7 .7 .7 .8 .8 .8 .8 .7 .7 .7 .7 .7 .7 .7 .7 .6 .6 .6 .7 .7 .7 .7 .7 .6 .7 .6 .7 .8 .8
.7 .7 .6 .7 .6 .6 .5 .5 .5 .5 .6 .6 .6 .6 .5 .5 .5 .4 .5 .6 .4 .5 .5 .5 .6 .6 .6 .6 .5 .5 .5 .6 .5 .6 .6 .6
.5 .5 .5 .4 .4 .3 .3 .3 .3 .3 .3 .4 .4 .3 .3 .3 .2 .3 .3 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .3 .4 .3 .4
.2 .2 .3 .2 .3 .2 .1 .2 .1 .2 .1 .2 .3 .2 .2 .2 .0 .1 .1 .1 .2 .2 .3 .3 .3 .4 .3 .5 .3 .2 .2 .0 .1 .1 .1 .2
.1 .1 .2 .1 .1 .1 .1 .1 .0 .1 .0 .1 .1 .0 .1 .0 -.1 .0 -.1 -.1 .1 .0 .1 .1 .0 .0 .0 .0 .0 .0 .1 .0 .1 .0 .0 .2
.1 .1 .1 .1 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 -.1 .0 .0 -.2 .0 -.1 .0 .1 .0 .0 -.1 .1 .0 -.1 .1 .0 .0 -.1 .0 .1
.1 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 -.1 .0 .0 .0 .0 .0 .1 .0 -.1 .0 .0 .1 .1 .0 .0 .0 -.1 -.1 -.1 .0 .0 -.1 -.1 .0 .1
.1 .0 .0 .0 .0 .0 .0 .0 .1 .0 .0 .0 .0 .0 .0 .0 .0 .1 .1 .0 .0 .1 .0 .0 .0 -.1 -.1 -.1 -.1 .0 -.1 .0 -.1 -.1 .0 .0
.0 .0 .0 .0 -.1 .0 .0 .0 .0 .0 .0 .1 .0 .1 .0 .0 .1 .1 .0 .0 -.1 .0 .0 .0 -.1 -.1 -.1 -.1 .0 .0 -.1 .0 -.1 -.1 -.1 -.1
.1 .1 .1 .1 .0 .1 .1 .1 .2 .1 .1 .2 .1 .1 .0 .1 .1 .1 .1 .1 .0 .1 .0 .1 .0 .0 .1 .1 .0 .1 .0 .1 .0 .0 .0 .0
.3 .3 .2 .3 .3 .3 .2 .2 .2 .2 .3 .3 .2 .2 .2 .2 .3 .2 .2 .2 .2 .3 .2 .3 .2 .2 .3 .2 .2 .2 .1 .2 .2 .2 .3 .3
.5 .4 .3 .3 .3 .3 .3 .3 .3 .3 .2 .3 .3 .2 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .4
.3 .3 .3 .2 .2 .2 .3 .3 .2 .2 .1 .1 .1 .0 .1 .3 .3 .2 .2 .2 .3 .3 .4 .4 .4 .3 .2 .3 .2 .1 .2 .1 .2 .1 .1 .2
-.1 .0 .0 -.1 .0 .0 .0 -.1 -.1 -.1 -.1 -.2 -.2 -.2 -.2 -.1 -.1 -.2 -.2 -.2 -.1 -.2 -.1 -.1 -.1 .0 -.1 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2
-.4 -.4 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.4 -.4 -.5 -.5 -.5 -.5 -.4 -.5 -.4 -.4 -.3 -.3 -.2 -.1 -.3 -.4 -.3 -.2 .0 -.2 -.2 -.2 -.2 -.2 -.3 -.3 -.4
-.3 -.3 -.3 -.3 -.3 -.2 -.2 -.2 -.2 -.2 -.3 -.3 -.4 -.4 -.4 -.4 -.5 -.4 -.4 -.4 -.4 -.3 -.2 -.1 .0 .0 -.1 -.1 -.2 -.2 -.2 -.2 -.2 -.2 -.3 -.3

Figure 47. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2002
Channel: HIRS4 (400 hPa)
NOAA16, using all observations



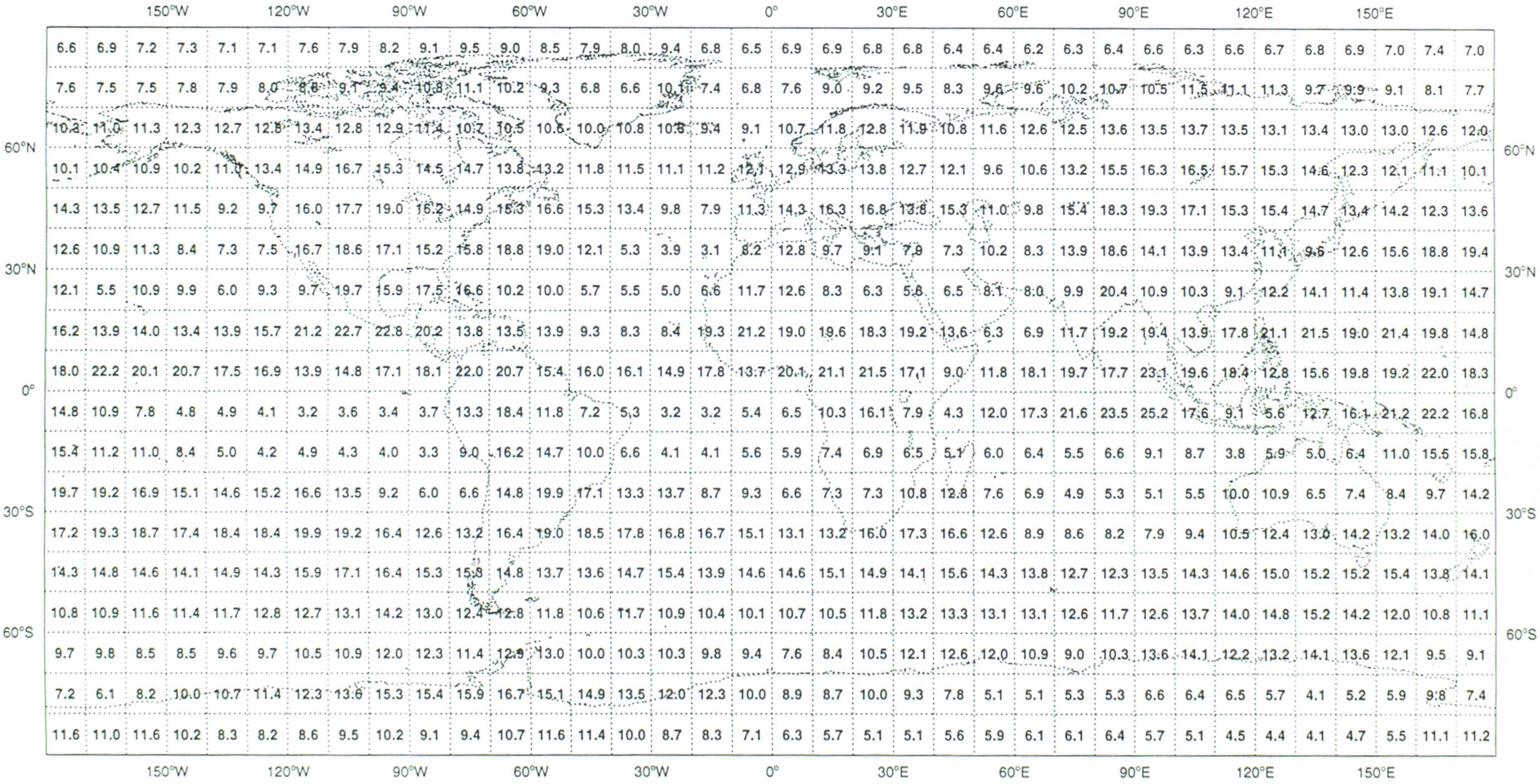
.7	.7	.7	.7	.7	.7	.7	.7	.7	.8	.8	.8	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.8	.8	.8	.8	.8	.8	.8
.7	.7	.7	.8	.8	.8	.7	.8	.8	.8	.8	.8	.8	.7	.7	.7	.7	.7	.7	.7	.7	.8	.8	.8	.7	.7	.7	.7	.7	.7	.8	.8	.8	.8	.8	.7
.8	.8	.7	.8	.7	.7	.7	.7	.7	.7	.8	.8	.8	.8	.7	.7	.7	.7	.7	.7	.7	.7	.6	.6	.6	.7	.7	.7	.7	.7	.6	.7	.6	.7	.8	.8
.7	.7	.6	.7	.6	.6	.5	.5	.5	.5	.6	.6	.6	.6	.5	.5	.5	.4	.5	.6	.4	.5	.5	.5	.6	.6	.6	.6	.5	.5	.5	.6	.5	.6	.6	.6
.5	.5	.5	.4	.4	.3	.3	.3	.3	.3	.3	.4	.4	.3	.3	.3	.2	.3	.3	.4	.3	.4	.4	.4	.4	.4	.4	.4	.4	.4	.5	.4	.3	.4	.3	.4
.2	.2	.3	.2	.3	.2	.1	.2	.1	.2	.1	.2	.3	.2	.2	.2	.0	.1	.1	.1	.2	.2	.3	.3	.3	.4	.3	.5	.3	.2	.2	.0	.1	.1	.1	.2
.1	.1	.2	.1	.1	.1	.1	.1	.0	.1	.0	.1	.1	.0	.1	.0	-.1	.0	-.1	-.1	.1	.0	.1	.1	.0	.0	.0	.0	.0	.0	.1	.0	.1	.0	.0	.2
.1	.1	.1	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	-.1	.0	.0	-.2	.0	-.1	.0	.1	.0	.0	-.1	.1	.0	-.1	.1	.0	.0	-.1	.0	.1
.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	-.1	.0	.0	.0	.0	.0	.1	.0	-.1	.0	.0	.1	.1	.0	.0	.0	-.1	-.1	-.1	.0	.0	-.1	-.1	.0	.1
.1	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.1	.1	.0	.0	.1	.0	.0	.0	-.1	-.1	-.1	-.1	.0	-.1	.0	-.1	-.1	.0	.0
.0	.0	.0	.0	-.1	.0	.0	.0	.0	.0	.0	.1	.0	.1	.0	.0	.1	.1	.0	.0	-.1	.0	.0	.0	-.1	-.1	-.1	-.1	.0	.0	-.1	.0	-.1	-.1	-.1	-.1
.1	.1	.1	.1	.0	.1	.1	.1	.2	.1	.1	.2	.1	.1	.0	.1	.1	.1	.1	.1	.0	.1	.0	.1	.0	.0	.1	.1	.0	.1	.0	.1	.0	.0	.0	.0
.3	.3	.2	.3	.3	.3	.2	.2	.2	.2	.3	.3	.2	.2	.2	.2	.3	.2	.2	.2	.2	.3	.2	.3	.2	.2	.3	.2	.2	.2	.1	.2	.2	.2	.3	.3
.5	.4	.3	.3	.3	.3	.3	.3	.3	.3	.2	.3	.3	.2	.3	.3	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.3	.3	.3	.3	.3	.3	.4
.3	.3	.3	.2	.2	.2	.3	.3	.2	.2	.1	.1	.1	.0	.1	.3	.3	.2	.2	.2	.3	.3	.4	.4	.4	.3	.2	.3	.2	.1	.2	.1	.2	.1	.1	.2
-.1	.0	.0	-.1	.0	.0	.0	-.1	-.1	-.1	-.1	-.2	-.2	-.2	-.2	-.1	-.1	-.2	-.2	-.2	-.1	-.2	-.1	-.1	-.1	.0	-.1	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2	-.2
-.4	-.4	-.3	-.3	-.3	-.3	-.3	-.3	-.3	-.4	-.4	-.5	-.5	-.5	-.5	-.4	-.5	-.4	-.4	-.3	-.3	-.2	-.1	-.3	-.4	-.3	-.2	.0	-.2	-.2	-.2	-.2	-.2	-.3	-.3	-.4
-.3	-.3	-.3	-.3	-.3	-.2	-.2	-.2	-.2	-.2	-.3	-.3	-.4	-.4	-.4	-.4	-.5	-.4	-.4	-.4	-.4	-.3	-.2	-.1	.0	.0	-.1	-.1	-.2	-.2	-.2	-.2	-.2	-.2	-.3	-.3

Figure 48. ATOVS SD O-B brightness temperature differences (deg C). JULY 2002
Channel: HIRS4 (400 hPa)
NOAA16, using all observations



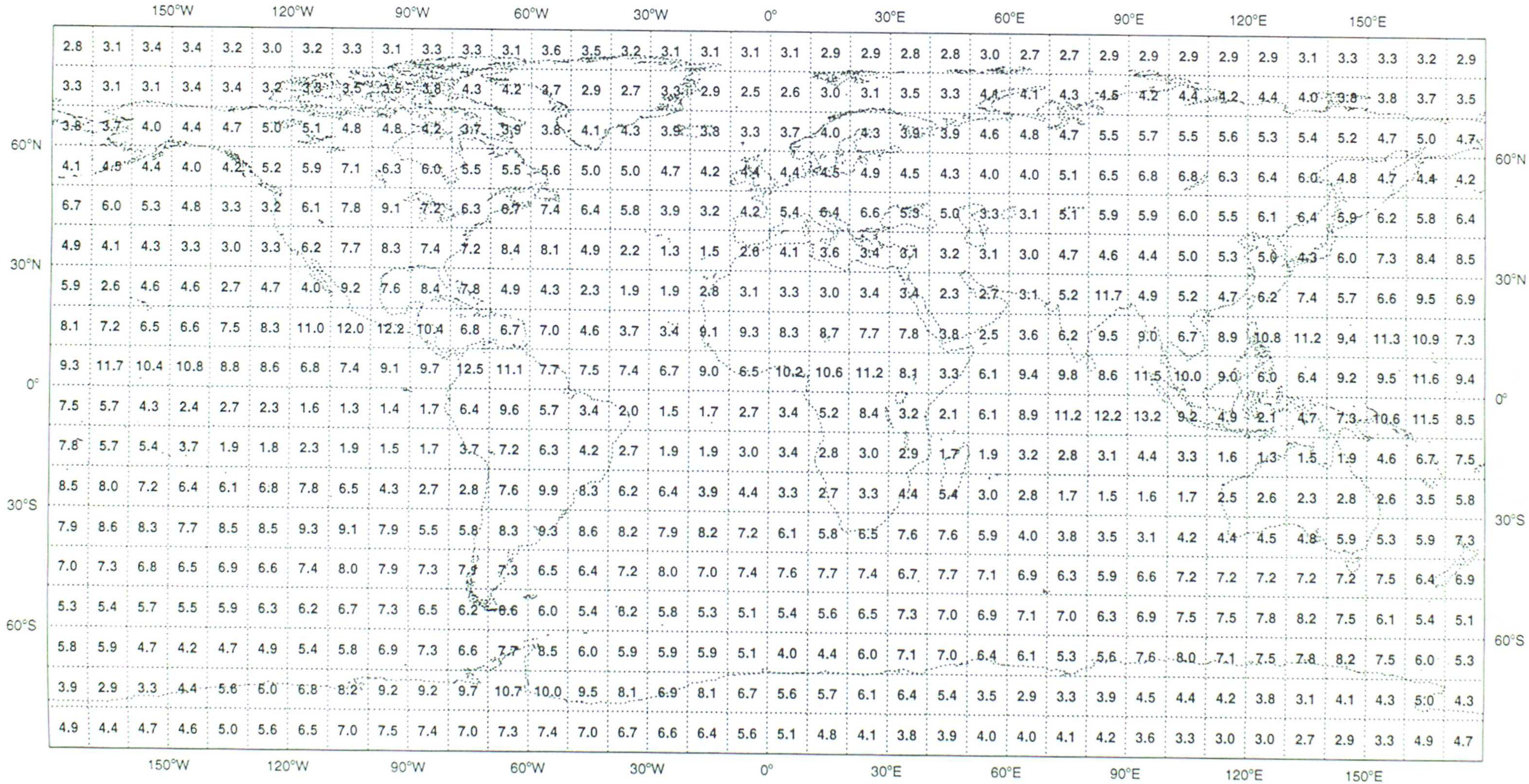
.5	.6	.7	.7	.6	.5	.5	.6	.5	.5	.5	.5	.6	.6	.6	.6	.6	.5	.5	.6	.6	.5	.6	.6	.5	.5	.5	.5	.5	.5	.5	.6	.6	.6	.6	.5
.7	.7	.7	.7	.6	.5	.6	.6	.6	.6	.7	.7	.6	.6	.6	.6	.5	.5	.5	.5	.6	.7	.6	.7	.7	.7	.7	.7	.7	.7	.8	.8	.8	.8	.7	.7
.9	.7	.8	.8	.9	.9	1.0	1.0	1.0	.9	.8	.8	.7	.7	.8	.7	.8	.7	.7	.8	.8	.8	.8	1.0	1.0	.8	1.0	1.1	1.2	1.2	1.1	1.2	1.0	1.0	1.0	1.1
.8	1.0	1.0	.9	.9	1.0	1.4	1.7	1.5	1.3	1.2	1.2	1.3	1.1	1.3	1.2	.9	.9	.8	.9	1.1	.9	.9	.8	.9	1.0	1.2	1.3	1.5	1.4	1.4	1.5	1.0	1.0	1.0	.9
1.9	1.5	1.3	1.1	.7	.8	1.4	2.0	2.5	1.9	1.6	1.7	2.0	1.5	1.5	.9	.7	.9	1.1	1.3	1.4	1.1	1.0	.6	.6	1.0	1.1	1.3	1.3	1.2	1.3	1.4	1.5	1.5	1.6	1.8
1.4	1.0	1.0	.8	.7	.9	1.6	2.2	2.6	2.2	2.1	2.4	2.1	1.3	.6	.5	.5	.6	.8	.7	.7	.6	.5	.5	.5	1.1	1.1	.9	1.1	1.2	1.3	1.3	1.7	2.1	2.4	2.6
1.7	.8	1.1	1.2	.7	1.4	1.2	2.9	2.5	2.7	2.5	1.4	1.1	.6	.4	.4	.5	.5	.6	.6	.4	.4	.5	.5	.9	2.0	4.5	1.7	1.6	1.5	2.0	2.5	2.0	2.3	2.9	2.2
2.8	2.6	2.3	2.2	2.6	2.9	3.9	4.4	4.5	3.4	2.3	2.1	2.2	1.4	1.2	1.1	3.1	3.0	2.6	3.0	2.2	2.5	1.1	.9	1.4	2.2	3.6	3.3	2.6	3.3	3.8	4.2	3.5	4.1	3.9	2.6
3.2	4.0	3.5	3.6	2.9	2.8	2.2	2.5	3.1	3.1	4.3	3.6	2.4	2.2	2.2	2.1	2.9	2.0	3.2	3.5	3.8	2.6	1.2	2.0	3.1	3.5	3.1	4.3	3.6	3.0	2.3	2.4	3.2	3.6	4.0	3.1
2.5	1.7	1.2	.7	1.1	1.0	.6	.4	.5	.5	1.8	3.0	1.6	1.0	.5	.4	.4	.8	.9	1.3	2.4	.8	.9	2.0	3.0	3.6	4.3	4.9	3.2	1.6	.8	1.5	2.4	3.7	4.0	2.8
2.6	1.7	1.5	.8	.6	.6	.8	.6	.5	.5	.8	1.7	1.7	1.1	.8	.6	.5	.8	1.0	.7	.7	.7	.6	.6	1.0	.8	1.0	1.6	1.2	.6	.5	.5	.7	1.6	2.1	2.3
2.1	2.0	1.9	1.4	1.5	1.6	1.9	1.6	1.2	.7	.7	1.6	2.6	2.2	1.7	1.8	1.0	1.1	.9	.6	.6	.8	1.0	.6	.6	.5	.5	.5	.5	.6	.5	.5	.7	.5	.8	1.4
1.6	2.1	1.9	1.7	1.9	2.0	2.3	2.2	2.0	1.3	1.1	1.9	2.4	2.3	2.0	1.9	2.1	1.6	1.2	1.1	1.3	1.3	1.5	1.4	.9	.8	.8	.6	.8	.8	.7	.8	1.2	.9	.9	1.5
1.5	1.8	1.5	1.4	1.5	1.2	1.6	2.0	2.2	2.0	1.8	1.7	1.4	1.3	1.6	1.9	1.8	1.9	2.0	2.0	1.8	1.5	1.6	1.7	1.7	1.5	1.3	1.3	1.4	1.4	1.4	1.3	1.4	1.7	1.3	1.5
1.4	1.4	1.3	1.3	1.4	1.4	1.3	1.5	1.8	1.6	1.5	1.4	1.2	1.3	1.3	1.3	1.3	1.2	1.3	1.5	1.7	2.2	2.0	1.9	2.0	2.1	1.6	1.8	1.8	1.7	1.8	1.8	1.8	1.6	1.4	1.1
1.4	1.4	1.1	1.1	1.2	1.3	1.6	1.6	1.8	2.1	1.9	2.1	2.5	2.0	2.2	2.2	1.5	1.4	1.1	1.1	1.4	1.8	1.8	1.6	1.6	1.6	1.4	1.8	1.9	1.9	1.9	2.1	2.4	2.2	1.7	1.4
1.0	.7	.7	.9	1.3	1.5	1.9	2.4	2.8	3.0	3.3	3.9	3.9	4.1	3.8	3.2	3.2	2.7	2.1	1.8	1.6	1.7	1.5	.9	.8	.9	1.3	1.5	1.5	1.4	1.4	1.3	1.5	1.5	1.3	1.1
.9	.8	.9	1.0	1.2	1.5	2.0	2.4	2.7	2.8	2.7	2.9	3.0	3.0	2.9	2.6	2.6	2.4	2.2	1.9	1.6	1.5	1.4	1.4	1.3	1.3	1.2	1.1	1.0	1.0	.9	.7	.7	.7	.7	.8

Figure 49. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2002
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations



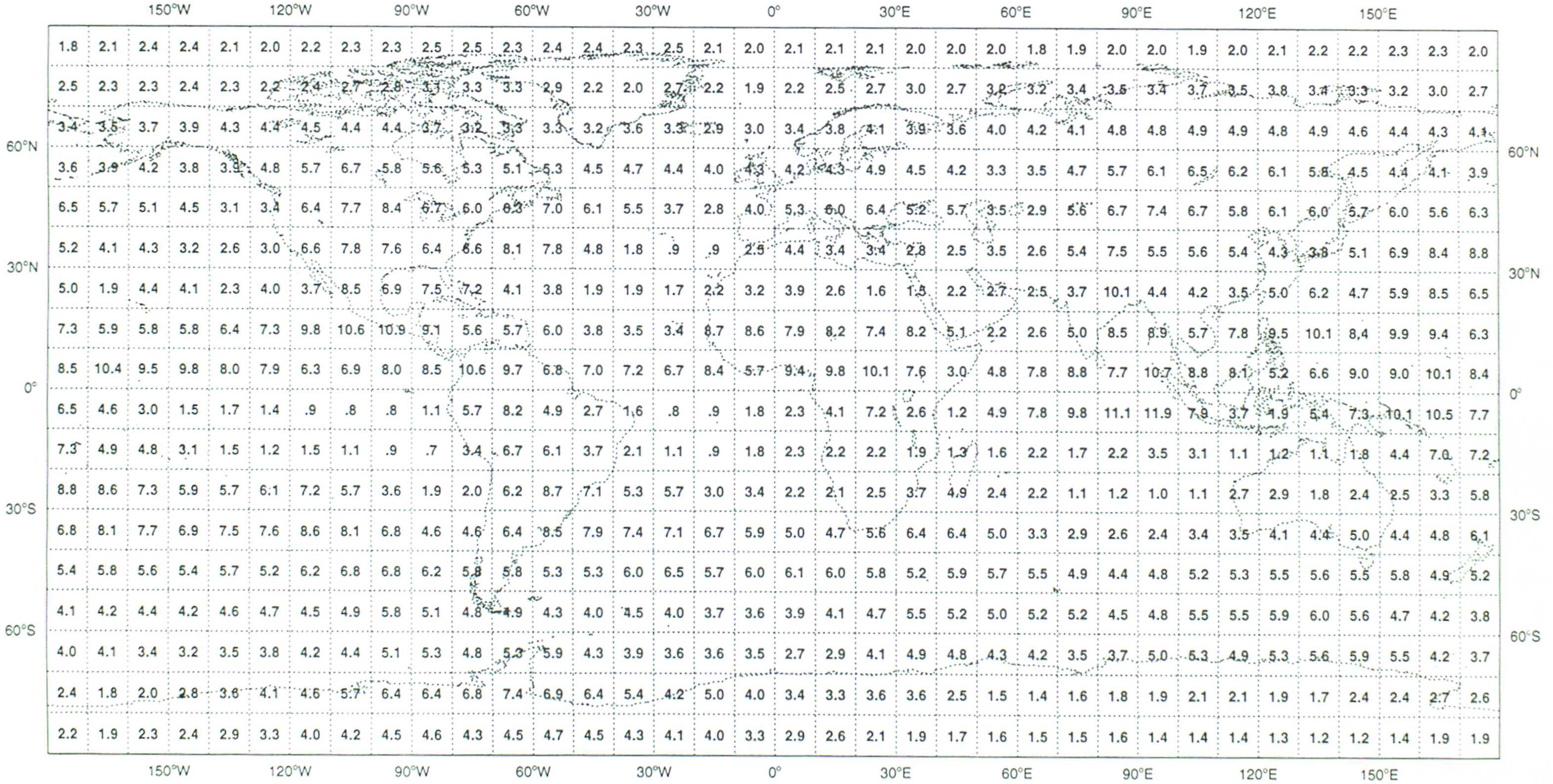
6.6	6.9	7.2	7.3	7.1	7.1	7.6	7.9	8.2	9.1	9.5	9.0	8.5	7.9	8.0	9.4	6.8	6.5	6.9	6.9	6.8	6.8	6.4	6.4	6.2	6.3	6.4	6.6	6.3	6.6	6.7	6.8	6.9	7.0	7.4	7.0
7.6	7.5	7.5	7.8	7.9	8.0	8.8	9.1	9.4	10.8	11.1	10.2	9.3	6.8	6.6	10.1	7.4	6.8	7.6	9.0	9.2	9.5	8.3	9.6	9.6	10.2	10.7	10.5	11.5	11.1	11.3	9.7	9.9	9.1	8.1	7.7
10.3	11.0	11.3	12.3	12.7	12.8	13.4	12.8	12.9	11.4	10.7	10.5	10.6	10.0	10.8	10.8	9.4	9.1	10.7	11.8	12.8	11.9	10.8	11.6	12.6	12.5	13.6	13.5	13.7	13.5	13.1	13.4	13.0	13.0	12.6	12.0
10.1	10.4	10.9	10.2	11.0	13.4	14.9	16.7	15.3	14.5	14.7	13.8	13.2	11.8	11.5	11.1	11.2	12.1	12.9	13.3	13.8	12.7	12.1	9.6	10.6	13.2	15.5	16.3	16.5	15.7	15.3	14.6	12.3	12.1	11.1	10.1
14.3	13.5	12.7	11.5	9.2	9.7	16.0	17.7	19.0	16.2	14.9	15.3	16.6	15.3	13.4	9.8	7.9	11.3	14.3	16.3	16.8	13.8	15.3	11.0	9.8	15.4	18.3	19.3	17.1	15.3	15.4	14.7	13.4	14.2	12.3	13.6
12.6	10.9	11.3	8.4	7.3	7.5	16.7	18.6	17.1	15.2	15.8	18.8	19.0	12.1	5.3	3.9	3.1	8.2	12.8	9.7	9.1	7.9	7.3	10.2	8.3	13.9	18.6	14.1	13.9	13.4	11.1	9.6	12.6	15.6	18.8	19.4
12.1	5.5	10.9	9.9	6.0	9.3	9.7	19.7	15.9	17.5	16.6	10.2	10.0	5.7	5.5	5.0	6.6	11.7	12.6	8.3	6.3	5.8	6.5	8.1	8.0	9.9	20.4	10.9	10.3	9.1	12.2	14.1	11.4	13.8	19.1	14.7
16.2	13.9	14.0	13.4	13.9	15.7	21.2	22.7	22.8	20.2	13.8	13.5	13.9	9.3	8.3	8.4	19.3	21.2	19.0	19.6	18.3	19.2	13.6	6.3	6.9	11.7	19.2	19.4	13.9	17.8	21.1	21.5	19.0	21.4	19.8	14.8
18.0	22.2	20.1	20.7	17.5	16.9	13.9	14.8	17.1	18.1	22.0	20.7	15.4	16.0	16.1	14.9	17.8	13.7	20.1	21.1	21.5	17.1	9.0	11.8	18.1	19.7	17.7	23.1	19.6	18.4	12.8	15.6	19.8	19.2	22.0	18.3
14.8	10.9	7.8	4.8	4.9	4.1	3.2	3.6	3.4	3.7	13.3	18.4	11.8	7.2	5.3	3.2	3.2	5.4	6.5	10.3	16.1	7.9	4.3	12.0	17.3	21.6	23.5	25.2	17.6	9.1	5.6	12.7	16.1	21.2	22.2	16.8
15.4	11.2	11.0	8.4	5.0	4.2	4.9	4.3	4.0	3.3	9.0	16.2	14.7	10.0	6.6	4.1	4.1	5.6	5.9	7.4	6.9	6.5	5.1	6.0	6.4	5.5	6.6	9.1	8.7	3.8	5.9	5.0	6.4	11.0	15.5	15.8
19.7	19.2	16.9	15.1	14.6	15.2	16.6	13.5	9.2	6.0	6.6	14.8	19.9	17.1	13.3	13.7	8.7	9.3	6.6	7.3	7.3	10.8	12.8	7.6	6.9	4.9	5.3	5.1	5.5	10.0	10.9	6.5	7.4	8.4	9.7	14.2
17.2	19.3	18.7	17.4	18.4	18.4	19.9	19.2	16.4	12.6	13.2	16.4	19.0	18.5	17.8	16.8	16.7	15.1	13.1	13.2	16.0	17.3	16.6	12.6	8.9	8.6	8.2	7.9	9.4	10.5	12.4	13.0	14.2	13.2	14.0	16.0
14.3	14.8	14.6	14.1	14.9	14.3	15.9	17.1	16.4	15.3	15.8	14.8	13.7	13.6	14.7	15.4	13.9	14.6	14.6	15.1	14.9	14.1	15.6	14.3	13.8	12.7	12.3	13.5	14.3	14.6	15.0	15.2	15.2	15.4	13.8	14.1
10.8	10.9	11.6	11.4	11.7	12.8	12.7	13.1	14.2	13.0	12.4	12.8	11.8	10.6	11.7	10.9	10.4	10.1	10.7	10.5	11.8	13.2	13.3	13.1	13.1	12.6	11.7	12.6	13.7	14.0	14.8	15.2	14.2	12.0	10.8	11.1
9.7	9.8	8.5	8.5	9.6	9.7	10.5	10.9	12.0	12.3	11.4	12.9	13.0	10.0	10.3	10.3	9.8	9.4	7.6	8.4	10.5	12.1	12.6	12.0	10.9	9.0	10.3	13.6	14.1	12.2	13.2	14.1	13.6	12.1	9.5	9.1
7.2	6.1	8.2	10.0	10.7	11.4	12.3	13.6	15.3	15.4	15.9	16.7	15.1	14.9	13.5	12.0	12.3	10.0	8.9	8.7	10.0	9.3	7.8	5.1	5.1	5.3	5.3	6.6	6.4	6.5	5.7	4.1	5.2	5.9	9.8	7.4
11.6	11.0	11.6	10.2	8.3	8.2	8.6	9.5	10.2	9.1	9.4	10.7	11.6	11.4	10.0	8.7	8.3	7.1	6.3	5.7	5.1	5.1	5.6	5.9	6.1	6.1	6.4	5.7	5.1	4.5	4.4	4.1	4.7	5.5	11.1	11.2

Figure 50. ATOVS SD O-B brightness temperature differences (deg C). JULY 2002
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations



2.8	3.1	3.4	3.4	3.2	3.0	3.2	3.3	3.1	3.3	3.3	3.1	3.6	3.5	3.2	3.1	3.1	3.1	3.1	2.9	2.9	2.8	2.8	3.0	2.7	2.7	2.9	2.9	2.9	2.9	2.9	3.1	3.3	3.3	3.2	2.9
3.3	3.1	3.1	3.4	3.4	3.2	3.3	3.5	3.5	3.8	4.3	4.2	3.7	2.9	2.7	3.3	2.9	2.5	2.6	3.0	3.1	3.5	3.3	4.4	4.1	4.3	4.5	4.2	4.4	4.2	4.4	4.0	3.8	3.8	3.7	3.5
3.8	3.7	4.0	4.4	4.7	5.0	5.1	4.8	4.8	4.2	3.7	3.9	3.8	4.1	4.3	3.9	3.8	3.3	3.7	4.0	4.3	3.9	3.9	4.6	4.8	4.7	5.5	5.7	5.5	5.6	5.3	5.4	5.2	4.7	5.0	4.7
4.1	4.5	4.4	4.0	4.2	5.2	5.9	7.1	6.3	6.0	5.5	5.5	5.6	5.0	5.0	4.7	4.2	4.4	4.4	4.5	4.9	4.5	4.3	4.0	4.0	5.1	6.5	6.8	6.8	6.3	6.4	6.0	4.8	4.7	4.4	4.2
6.7	6.0	5.3	4.8	3.3	3.2	6.1	7.8	9.1	7.2	6.3	6.7	7.4	6.4	5.8	3.9	3.2	4.2	5.4	6.4	6.6	5.3	5.0	3.3	3.1	5.1	5.9	5.9	6.0	5.5	6.1	6.4	5.9	6.2	5.8	6.4
4.9	4.1	4.3	3.3	3.0	3.3	6.2	7.7	8.3	7.4	7.2	8.4	8.1	4.9	2.2	1.3	1.5	2.6	4.1	3.6	3.4	3.1	3.2	3.1	3.0	4.7	4.6	4.4	5.0	5.3	5.0	4.3	6.0	7.3	8.4	8.5
5.9	2.6	4.6	4.6	2.7	4.7	4.0	9.2	7.6	8.4	7.8	4.9	4.3	2.3	1.9	1.9	2.8	3.1	3.3	3.0	3.4	3.4	2.3	2.7	3.1	5.2	11.7	4.9	5.2	4.7	6.2	7.4	5.7	6.6	9.5	6.9
8.1	7.2	6.5	6.6	7.5	8.3	11.0	12.0	12.2	10.4	6.8	6.7	7.0	4.6	3.7	3.4	9.1	9.3	8.3	8.7	7.7	7.8	3.8	2.5	3.6	6.2	9.5	9.0	6.7	8.9	10.8	11.2	9.4	11.3	10.9	7.3
9.3	11.7	10.4	10.8	8.8	8.6	6.8	7.4	9.1	9.7	12.5	11.1	7.7	7.5	7.4	6.7	9.0	6.5	10.2	10.6	11.2	8.1	3.3	6.1	9.4	9.8	8.6	11.5	10.0	9.0	6.0	6.4	9.2	9.5	11.6	9.4
7.5	5.7	4.3	2.4	2.7	2.3	1.6	1.3	1.4	1.7	6.4	9.6	5.7	3.4	2.0	1.5	1.7	2.7	3.4	5.2	8.4	3.2	2.1	6.1	8.9	11.2	12.2	13.2	9.2	4.9	2.1	4.7	7.3	10.6	11.5	8.5
7.8	5.7	5.4	3.7	1.9	1.8	2.3	1.9	1.5	1.7	3.7	7.2	6.3	4.2	2.7	1.9	1.9	3.0	3.4	2.8	3.0	2.9	1.7	1.9	3.2	2.8	3.1	4.4	3.3	1.6	1.3	1.5	1.9	4.6	6.7	7.5
8.5	8.0	7.2	6.4	6.1	6.8	7.8	6.5	4.3	2.7	2.8	7.6	9.9	8.3	6.2	6.4	3.9	4.4	3.3	2.7	3.3	4.4	5.4	3.0	2.8	1.7	1.5	1.6	1.7	2.5	2.6	2.3	2.8	2.6	3.5	5.8
7.9	8.6	8.3	7.7	8.5	8.5	9.3	9.1	7.9	5.5	5.8	8.3	9.3	8.6	8.2	7.9	8.2	7.2	6.1	5.8	6.5	7.6	7.6	5.9	4.0	3.8	3.5	3.1	4.2	4.4	4.5	4.8	5.9	5.3	5.9	7.3
7.0	7.3	6.8	6.5	6.9	6.6	7.4	8.0	7.9	7.3	7.1	7.3	6.5	6.4	7.2	8.0	7.0	7.4	7.6	7.7	7.4	6.7	7.7	7.1	6.9	6.3	5.9	6.6	7.2	7.2	7.2	7.2	7.2	7.5	6.4	6.9
5.3	5.4	5.7	5.5	5.9	6.3	6.2	6.7	7.3	6.5	6.2	6.6	6.0	5.4	6.2	5.8	5.3	5.1	5.4	5.6	6.5	7.3	7.0	6.9	7.1	7.0	6.3	6.9	7.5	7.5	7.8	8.2	7.5	6.1	5.4	5.1
5.8	5.9	4.7	4.2	4.7	4.9	5.4	5.8	6.9	7.3	6.6	7.7	8.5	6.0	5.9	5.9	5.9	5.1	4.0	4.4	6.0	7.1	7.0	6.4	6.1	5.3	5.6	7.6	8.0	7.1	7.5	7.8	8.2	7.5	6.0	5.3
3.9	2.9	3.3	4.4	5.6	6.0	6.8	8.2	9.2	9.2	9.7	10.7	10.0	9.5	8.1	6.9	8.1	6.7	5.6	5.7	6.1	6.4	5.4	3.5	2.9	3.3	3.9	4.5	4.4	4.2	3.8	3.1	4.1	4.3	5.0	4.3
4.9	4.4	4.7	4.6	5.0	5.6	6.5	7.0	7.5	7.4	7.0	7.3	7.4	7.0	6.7	6.6	6.4	5.6	5.1	4.8	4.1	3.8	3.9	4.0	4.0	4.1	4.2	3.6	3.3	3.0	3.0	2.7	2.9	3.3	4.9	4.7

Figure 51. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2002
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations



1.8	2.1	2.4	2.4	2.1	2.0	2.2	2.3	2.3	2.5	2.5	2.3	2.4	2.4	2.3	2.5	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.0	1.8	1.9	2.0	2.0	1.9	2.0	2.1	2.2	2.2	2.3	2.3	2.0
2.5	2.3	2.3	2.4	2.3	2.2	2.4	2.7	2.8	3.1	3.3	3.3	2.9	2.2	2.0	2.7	2.2	1.9	2.2	2.5	2.7	3.0	2.7	3.2	3.2	3.4	3.6	3.4	3.7	3.5	3.8	3.4	3.3	3.2	3.0	2.7
3.4	3.5	3.7	3.9	4.3	4.4	4.5	4.4	4.4	3.7	3.2	3.3	3.3	3.2	3.6	3.3	2.9	3.0	3.4	3.8	4.1	3.9	3.6	4.0	4.2	4.1	4.8	4.8	4.9	4.9	4.8	4.9	4.6	4.4	4.3	4.1
3.6	3.9	4.2	3.8	3.9	4.8	5.7	6.7	5.8	5.6	5.3	5.1	5.3	4.5	4.7	4.4	4.0	4.3	4.2	4.3	4.9	4.5	4.2	3.3	3.5	4.7	5.7	6.1	6.5	6.2	6.1	5.8	4.5	4.4	4.1	3.9
6.5	5.7	5.1	4.5	3.1	3.4	6.4	7.7	8.4	6.7	6.0	6.3	7.0	6.1	5.5	3.7	2.8	4.0	5.3	6.0	6.4	5.2	5.7	3.5	2.9	5.6	6.7	7.4	6.7	5.8	6.1	6.0	5.7	6.0	5.6	6.3
5.2	4.1	4.3	3.2	2.6	3.0	6.6	7.8	7.6	6.4	6.6	8.1	7.8	4.8	1.8	.9	.9	2.5	4.4	3.4	3.4	2.8	2.5	3.5	2.6	5.4	7.5	5.5	5.6	5.4	4.3	3.8	5.1	6.9	8.4	8.8
5.0	1.9	4.4	4.1	2.3	4.0	3.7	8.5	6.9	7.5	7.2	4.1	3.8	1.9	1.9	1.7	2.2	3.2	3.9	2.6	1.6	1.5	2.2	2.7	2.5	3.7	10.1	4.4	4.2	3.5	5.0	6.2	4.7	5.9	8.5	6.5
7.3	5.9	5.8	5.8	6.4	7.3	9.8	10.6	10.9	9.1	5.6	5.7	6.0	3.8	3.5	3.4	8.7	8.6	7.9	8.2	7.4	8.2	5.1	2.2	2.6	5.0	8.5	8.9	5.7	7.8	9.5	10.1	8.4	9.9	9.4	6.3
8.5	10.4	9.5	9.8	8.0	7.9	6.3	6.9	8.0	8.5	10.6	9.7	6.8	7.0	7.2	6.7	8.4	5.7	9.4	9.8	10.1	7.6	3.0	4.8	7.8	8.8	7.7	10.7	8.8	8.1	5.2	6.6	9.0	9.0	10.1	8.4
6.5	4.6	3.0	1.5	1.7	1.4	.9	.8	.8	1.1	5.7	8.2	4.9	2.7	1.6	.8	.9	1.8	2.3	4.1	7.2	2.6	1.2	4.9	7.8	9.8	11.1	11.9	7.9	3.7	4.9	5.4	7.3	10.1	10.5	7.7
7.3	4.9	4.8	3.1	1.5	1.2	1.5	1.1	.9	.7	3.4	6.7	6.1	3.7	2.1	1.1	.9	1.8	2.3	2.2	2.2	1.9	1.3	1.6	2.2	1.7	2.2	3.5	3.1	1.1	1.2	1.1	1.8	4.4	7.0	7.2
8.8	8.6	7.3	5.9	5.7	6.1	7.2	5.7	3.6	1.9	2.0	6.2	8.7	7.1	5.3	5.7	3.0	3.4	2.2	2.1	2.5	3.7	4.9	2.4	2.2	1.1	1.2	1.0	1.1	2.7	2.9	1.8	2.4	2.5	3.3	5.8
6.8	8.1	7.7	6.9	7.5	7.6	8.6	8.1	6.8	4.6	4.6	6.4	8.5	7.9	7.4	7.1	6.7	5.9	5.0	4.7	5.6	6.4	6.4	5.0	3.3	2.9	2.6	2.4	3.4	3.5	4.1	4.4	5.0	4.4	4.8	6.1
5.4	5.8	5.6	5.4	5.7	5.2	6.2	6.8	6.8	6.2	5.8	5.8	5.3	5.3	6.0	6.5	5.7	6.0	6.1	6.0	5.8	5.2	5.9	5.7	5.5	4.9	4.4	4.8	5.2	5.3	5.5	5.6	5.5	5.8	4.9	5.2
4.1	4.2	4.4	4.2	4.6	4.7	4.5	4.9	5.8	5.1	4.8	4.9	4.3	4.0	4.5	4.0	3.7	3.6	3.9	4.1	4.7	5.5	5.2	5.0	5.2	5.2	4.5	4.8	5.5	5.5	5.9	6.0	5.6	4.7	4.2	3.8
4.0	4.1	3.4	3.2	3.5	3.8	4.2	4.4	5.1	5.3	4.8	5.3	5.9	4.3	3.9	3.6	3.6	3.5	2.7	2.9	4.1	4.9	4.8	4.3	4.2	3.5	3.7	5.0	5.3	4.9	5.3	5.6	5.9	5.5	4.2	3.7
2.4	1.8	2.0	2.8	3.6	4.1	4.6	5.7	6.4	6.4	6.8	7.4	6.9	6.4	5.4	4.2	5.0	4.0	3.4	3.3	3.6	3.6	2.5	1.5	1.4	1.6	1.8	1.9	2.1	2.1	1.9	1.7	2.4	2.4	2.7	2.6
2.2	1.9	2.3	2.4	2.9	3.3	4.0	4.2	4.5	4.6	4.3	4.5	4.7	4.5	4.3	4.1	4.0	3.3	2.9	2.6	2.1	1.9	1.7	1.6	1.5	1.5	1.6	1.4	1.4	1.4	1.3	1.2	1.2	1.4	1.9	1.9

Figure 52. ATOVS SD O-B brightness temperature differences (deg C). JULY 2002
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations

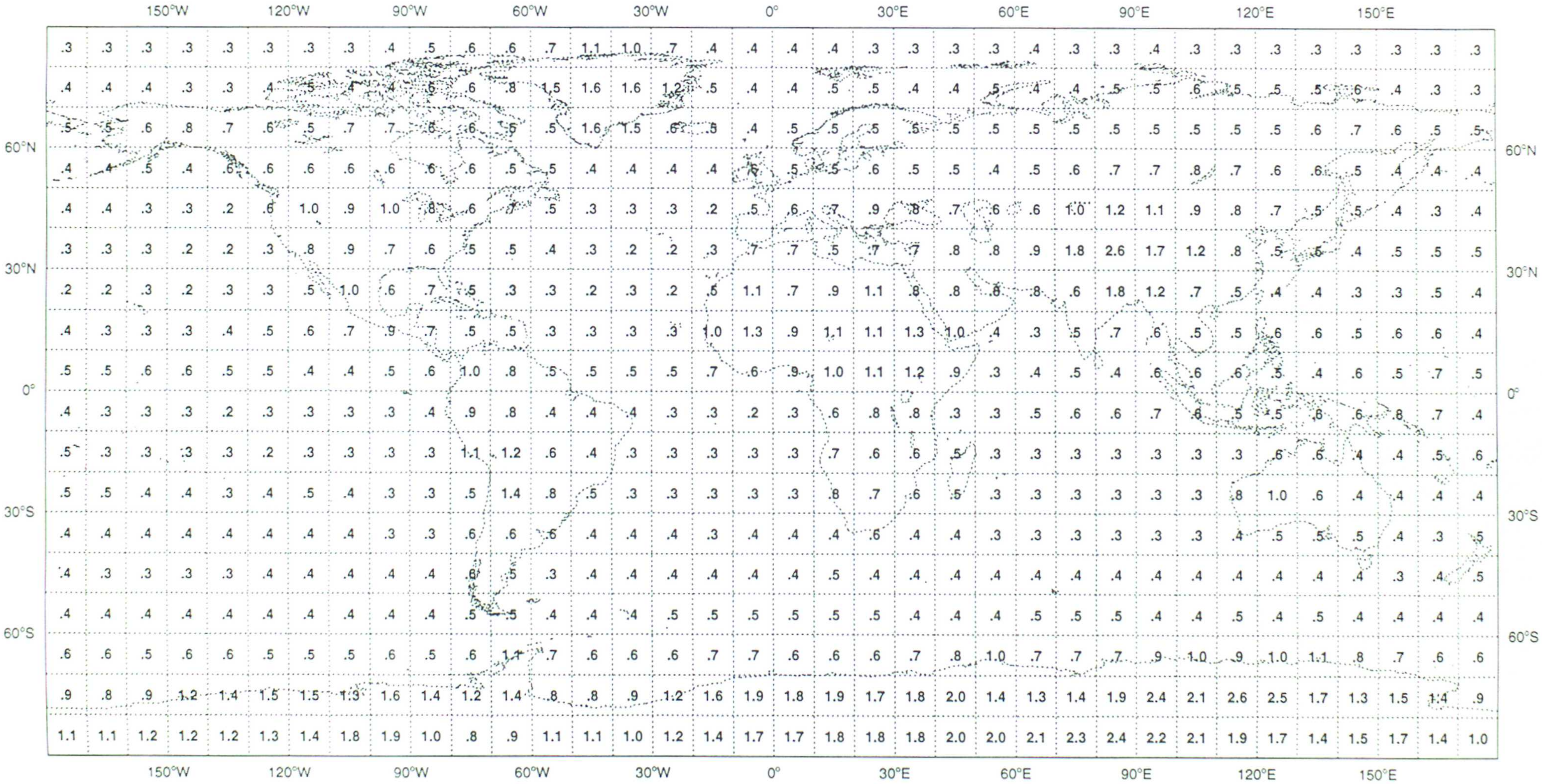
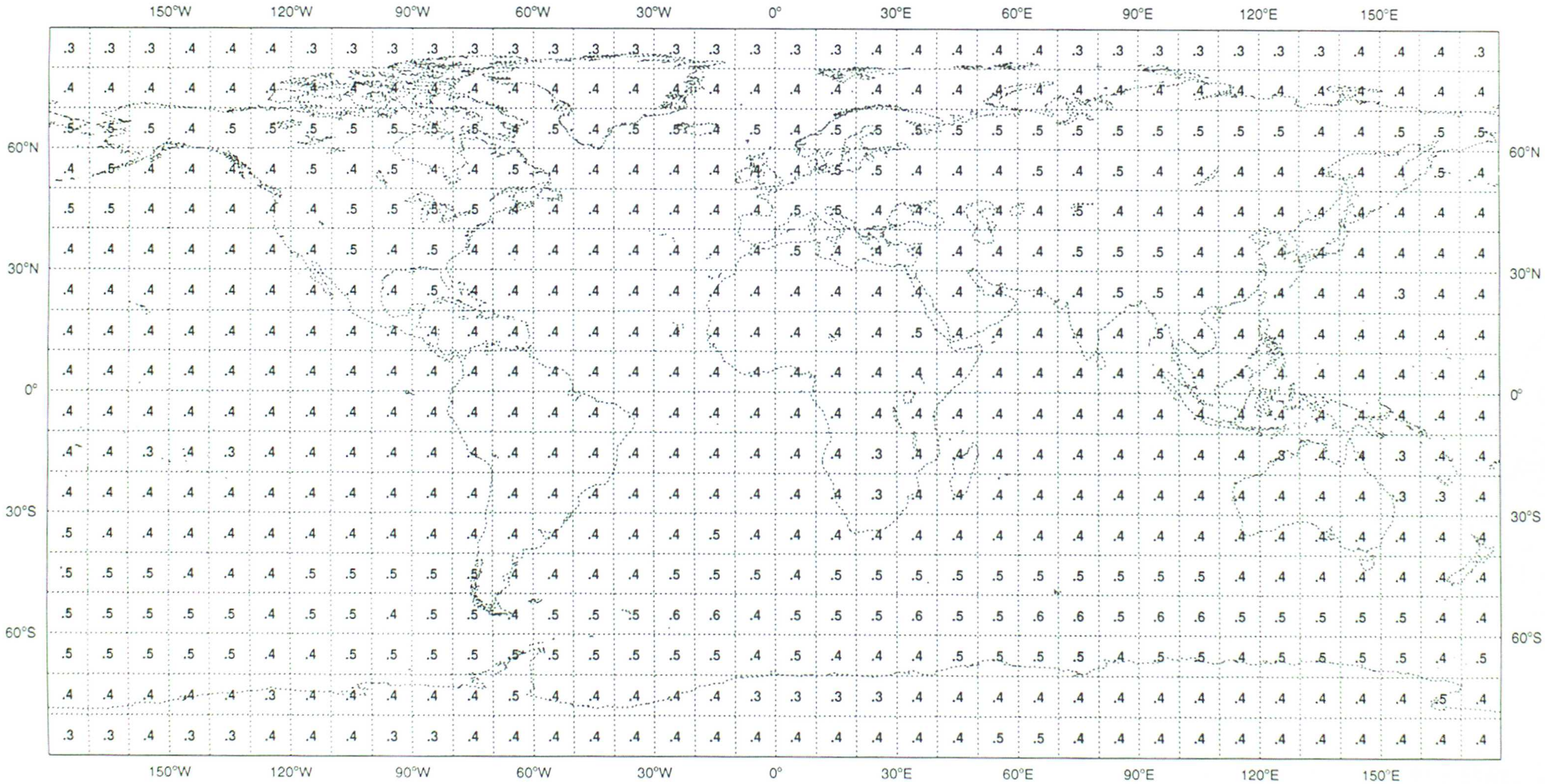

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .3 .3 .3 .3 .3 .3 .4 .5 .6 .6 .7 1.1 1.0 .7 .4 .4 .4 .4 .3 .3 .3 .3 .4 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3
.4 .4 .4 .3 .3 .4 .5 .4 .4 .6 .6 .8 1.5 1.6 1.6 1.2 .5 .4 .4 .5 .5 .4 .4 .5 .4 .4 .5 .5 .6 .5 .5 .5 .6 .4 .3 .3
.5 .5 .6 .8 .7 .6 .5 .7 .7 .6 .6 .5 .5 1.6 1.5 .6 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .7 .6 .5 .5
.4 .4 .5 .4 .6 .6 .6 .6 .6 .6 .6 .5 .5 .4 .4 .4 .4 .6 .5 .5 .6 .5 .5 .4 .5 .6 .7 .7 .8 .7 .6 .6 .5 .4 .4 .4
.4 .4 .3 .3 .2 .6 1.0 .9 1.0 .8 .6 .7 .5 .3 .3 .3 .2 .5 .6 .7 .9 .8 .7 .6 .6 1.0 1.2 1.1 .9 .8 .7 .5 .5 .4 .3 .4
.3 .3 .3 .2 .2 .3 .8 .9 .7 .6 .5 .5 .4 .3 .2 .2 .3 .7 .7 .5 .7 .7 .8 .8 .9 1.8 2.6 1.7 1.2 .8 .5 .5 .4 .5 .5 .5
.2 .2 .3 .2 .3 .3 .5 1.0 .6 .7 .5 .3 .3 .2 .3 .2 .5 1.1 .7 .9 1.1 .8 .8 .8 .8 .6 1.8 1.2 .7 .5 .4 .4 .3 .3 .5 .4
.4 .3 .3 .3 .4 .5 .6 .7 .9 .7 .5 .5 .3 .3 .3 .3 1.0 1.3 .9 1.1 1.1 1.3 1.0 .4 .3 .5 .7 .6 .5 .5 .6 .6 .5 .6 .6 .4
.5 .5 .6 .6 .5 .5 .4 .4 .5 .6 1.0 .8 .5 .5 .5 .5 .7 .6 .9 1.0 1.1 1.2 .9 .3 .4 .5 .4 .6 .6 .6 .5 .4 .6 .5 .7 .5
.4 .3 .3 .3 .2 .3 .3 .3 .3 .4 .9 .8 .4 .4 .4 .3 .3 .2 .3 .6 .8 .8 .3 .3 .5 .6 .6 .7 .6 .5 .5 .8 .6 .8 .7 .4
.5 .3 .3 .3 .3 .2 .3 .3 .3 .3 1.1 1.2 .6 .4 .3 .3 .3 .3 .3 .7 .6 .6 .5 .3 .3 .3 .3 .3 .3 .3 .6 .6 .4 .4 .5 .6
.5 .5 .4 .4 .3 .4 .5 .4 .3 .3 .5 1.4 .8 .5 .3 .3 .3 .3 .3 .8 .7 .6 .5 .3 .3 .3 .3 .3 .3 .8 1.0 .6 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .6 .6 .6 .4 .4 .4 .3 .4 .4 .4 .6 .4 .4 .3 .3 .3 .3 .3 .3 .4 .5 .5 .5 .4 .3 .5
.4 .3 .3 .3 .3 .4 .4 .4 .4 .4 .6 .5 .3 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .5
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .5 .5 .5 .5 .5 .5 .4 .4 .4 .5 .5 .5 .4 .4 .5 .4 .5 .4 .4 .4 .4
.6 .6 .5 .6 .6 .5 .5 .5 .6 .5 .6 1.1 .7 .6 .6 .6 .7 .7 .6 .6 .6 .7 .8 1.0 .7 .7 .7 .9 1.0 .9 1.0 1.1 .8 .7 .6 .6
.9 .8 .9 1.2 1.4 1.5 1.5 1.3 1.6 1.4 1.2 1.4 .8 .8 .9 1.2 1.6 1.9 1.8 1.9 1.7 1.8 2.0 1.4 1.3 1.4 1.9 2.4 2.1 2.6 2.5 1.7 1.3 1.5 1.4 .9
1.1 1.1 1.2 1.2 1.2 1.3 1.4 1.8 1.9 1.0 .8 .9 1.1 1.1 1.0 1.2 1.4 1.7 1.7 1.8 1.8 1.8 2.0 2.0 2.1 2.3 2.4 2.2 2.1 1.9 1.7 1.4 1.5 1.7 1.4 1.0

Figure 53. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2002
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations


150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .3 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .3
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .4 .5 .4 .5 .5 .4 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5 .5 .5
.4 .5 .4 .4 .4 .4 .5 .4 .5 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .5 .4 .5 .4 .4 .4 .4 .4 .4 .4 .5 .4
.5 .5 .4 .4 .4 .4 .4 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .5 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .3 .4 .4
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.5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
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.4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4
.3 .3 .4 .3 .3 .4 .4 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4

Figure 54. ATOVS SD O-B brightness temperature differences (deg C). JULY 2002
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations

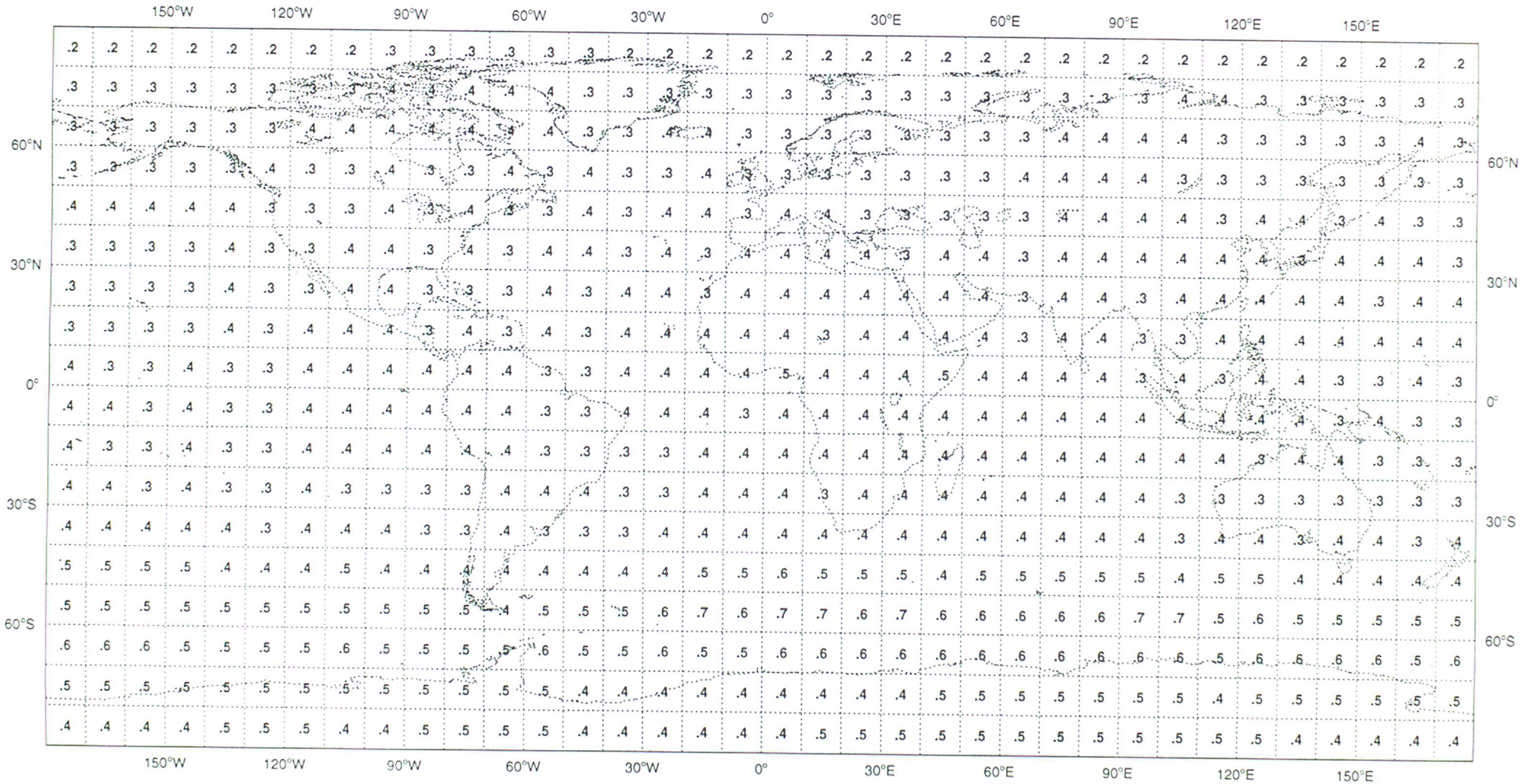
150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

TABLE 8

MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)
DATA TYPE:- DRIFTER
MONITORING CENTRE: BRACKNELL
MONTH: July 2002

Monitoring procedures
Period :One calendar month.

Data monitored :Reports from each unique identifier for drifting buoy.

Area monitored :10°N - 80°N, 85°W - 0°W

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :All hours combined.

Elements monitored :Mean sea-level pressure (hPa)
:Wind speed (m s^{-1})
:Wind direction (degrees)

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. A positive bias indicates the wind observation is veered to the background

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors

GROSS ERROR LIMITS :15 hPa (pressure)
:25 m s^{-1} (Vector Wind)

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
13503	22.5	-29.4	P	112	0	3	0.5	0.2	0.5
41501	21.1	-54.0	P	161	0	12	2.2	-0.8	2.3
41503	20.5	-41.6	P	597	0	1	0.7	-0.5	0.8
41522	18.7	-42.2	P	620	0	0	0.6	0.0	0.6
41523	27.5	-44.1	P	401	0	33	0.8	0.3	0.8
41528	15.4	-60.5	P	80	0	0	0.6	0.2	0.6
41556	20.5	-81.0	P	664	0	0	0.5	-0.6	0.8
41559	23.1	-71.1	P	658	0	1	0.5	-0.4	0.6
41561	22.3	-56.7	P	622	0	0	0.5	-0.8	1.0
41563	21.4	-53.9	P	641	0	1	0.5	-0.7	0.8
41577	36.7	-75.6	P	693	0	2	0.5	0.5	0.7
41579	40.3	-70.8	P	20	0	0	0.4	2.1	2.1
41625	24.9	-52.3	P	156	0	1	0.5	0.4	0.6
41630	35.8	-75.7	P	563	0	1	0.6	0.8	1.0
41640	31.8	-79.0	P	669	0	2	0.6	1.9	2.0
41641	30.3	-81.3	P	686	0	2	0.6	1.1	1.2
41643	31.9	-79.8	P	135	0	0	0.5	0.5	0.7
41645	29.6	-77.7	P	637	0	1	0.5	0.2	0.6
41647	29.8	-73.4	P	643	0	1	0.5	0.1	0.5
41648	25.6	-68.1	P	798	0	22	0.5	0.2	0.5
41649	11.1	-45.9	P	580	0	0	0.6	-0.7	0.9
41650	31.3	-67.8	P	659	0	0	0.6	0.6	0.8
41652	26.8	-68.3	P	825	0	25	0.5	0.2	0.5
41656	32.1	-80.8	P	808	0	18	0.6	0.5	0.8
41657	41.7	-30.0	P	303	0	1	0.6	-0.9	1.1
41658	35.1	-48.6	P	722	0	8	0.5	-0.8	0.9
41659	32.8	-30.2	P	661	0	1	0.4	0.3	0.5
41665	38.6	-57.4	P	681	1	100	1.4	11.0	11.0
41666	39.4	-58.3	P	693	0	2	0.9	-0.2	0.9
42533	40.1	-48.9	P	247	0	26	0.5	-0.9	1.0
44504	47.1	-40.6	P	369	0	5	0.8	-0.4	0.9
44517	41.7	-51.0	P	415	0	50	0.8	-0.4	0.9
44549	55.2	-26.2	P	1355	0	47	0.7	-0.8	1.1
44550	54.9	-20.9	P	1245	0	44	0.7	-0.4	0.8
44601	42.8	-40.7	P	679	0	8	0.8	-0.2	0.8
44602	44.3	-53.9	P	656	0	3	0.8	-0.5	0.9
44616	41.5	-19.7	P	758	0	9	0.5	-0.3	0.6
44621	61.2	-50.2	P	664	0	50	1.0	-0.4	1.1
44624	41.1	-19.2	P	1149	0	40	0.5	0.3	0.6
44625	37.4	-20.5	P	749	0	6	0.5	0.1	0.5
44627	41.3	-25.1	P	691	0	11	0.5	-0.4	0.7
44721	30.3	-40.5	P	1119	0	38	0.4	-0.4	0.6
44723	45.0	-27.5	P	706	0	3	0.7	0.4	0.8
44726	58.1	-44.4	P	1455	0	50	1.0	-0.3	1.0
44728	50.8	-22.5	P	741	0	39	0.7	-0.7	1.1
44730	58.7	-22.1	P	1349	0	48	0.8	-0.2	0.8
44742	59.6	-13.5	P	1318	0	46	0.7	-0.1	0.7
44743	61.4	-23.6	P	1198	1	64	1.0	-0.2	1.0
44763	45.4	-29.3	P	720	0	3	0.8	0.1	0.8
44764	51.7	-34.1	P	718	0	3	0.7	-0.7	0.9
44767	52.3	-36.6	P	803	0	23	0.7	-0.2	0.7
44769	55.4	-39.8	P	721	0	3	0.8	-0.4	0.9
44770	53.3	-42.6	P	686	0	2	0.8	-0.7	1.1
44772	58.1	-37.9	P	686	0	2	0.9	-0.3	1.0
44773	43.9	-36.5	P	712	0	3	0.7	0.5	0.8
44775	29.5	-43.4	P	741	0	2	0.4	-0.7	0.8
44778	49.0	-2.9	P	987	0	32	0.6	-0.2	0.6
44779	55.4	-10.9	P	229	0	38	0.9	0.1	0.9
44780	53.8	-28.5	P	478	0	31	0.7	-0.3	0.7
44811	41.1	-66.6	P	1	0	0	0.0	-0.5	0.5

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
44813	42.4	-70.7	P	1	0	0	0.0	-0.7	0.7
44843	61.0	-23.8	P	1	0	0	0.0	0.3	0.3
62501	31.5	-37.2	P	731	0	2	0.4	0.3	0.5
62502	48.7	-20.8	P	652	0	2	0.6	-0.4	0.7
62503	26.1	-34.8	P	1349	0	48	0.4	-1.0	1.1
62504	36.6	-18.0	P	676	0	3	0.5	0.1	0.5
62505	55.1	-32.1	P	712	0	4	0.6	-0.4	0.8
62506	45.7	-17.3	P	679	0	2	0.6	-0.7	0.9
62507	51.0	-17.7	P	702	0	3	0.7	-0.5	0.9
62508	43.0	-16.0	P	547	0	1	0.5	-0.1	0.5
62509	52.2	-24.3	P	695	0	3	0.9	0.4	0.9
62512	40.6	-15.2	P	977	0	31	0.6	-0.8	1.0
62608	53.4	-19.3	P	1	0	0	0.0	-0.4	0.4
62694	57.2	-21.1	P	407	0	4	0.8	-0.3	0.8
62696	54.3	-18.6	P	1277	0	44	0.7	-0.5	0.9
62697	50.0	-11.8	P	1113	0	36	0.6	-0.3	0.7
62703	49.9	-2.9	P	1	0	0	0.0	1.3	1.3
62705	55.0	-72.7	P	1	0	100	0.0	-13.6	13.6
62708	53.5	-19.5	P	1	0	0	0.0	-0.2	0.2
62711	60.4	-34.7	P	961	0	31	0.8	0.0	0.8
62738	58.3	-1.7	P	1	0	0	0.0	-0.7	0.7
62801	45.2	-5.0	P	1	0	0	0.0	-0.4	0.4
62805	55.0	-12.7	P	1	0	0	0.0	-0.1	0.1
62850	53.1	-11.2	P	1	0	0	0.0	0.2	0.2
63662	67.8	-26.5	P	26	42	92	1.7	-5.4	5.7
64549	58.4	-10.8	P	45	0	49	1.7	-0.5	1.8
64553	56.4	-25.2	P	662	0	39	0.6	-0.5	0.7
64845	59.1	-11.4	P	1	0	0	0.0	-0.7	0.7
945005	41.7	-82.4	P	1	0	0	0.0	2.2	2.2
945138	49.5	-65.8	P	1	0	0	0.0	0.5	0.5

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
WIND SPEED									
13503	22.5	-29.4	SPEED	8	13	100	0.0	11.2	11.2
41501	21.1	-54.0	SPEED	3	0	100	0.3	10.0	10.0
41503	20.5	-41.6	SPEED	594	0	100	1.1	-0.4	1.2
41522	18.7	-42.2	SPEED	619	0	100	1.4	0.2	1.5
41528	15.4	-60.5	SPEED	2	0	100	1.0	11.6	11.6
41556	20.5	-81.0	SPEED	510	1	100	2.2	0.8	2.4
41559	23.1	-71.1	SPEED	646	0	100	1.6	0.2	1.6
41561	22.3	-56.7	SPEED	616	0	100	1.3	-0.2	1.3
41563	21.4	-53.9	SPEED	636	0	100	1.2	-0.1	1.2
41625	24.9	-52.3	SPEED	8	0	100	0.3	12.8	12.8
41645	29.6	-77.7	SPEED	633	0	100	1.9	-3.2	3.7
41647	29.8	-73.4	SPEED	639	0	100	2.0	-0.2	2.0
41648	25.6	-68.1	SPEED	797	0	100	1.6	-0.4	1.7
41649	11.1	-45.9	SPEED	579	0	100	1.6	0.3	1.7
41652	26.8	-68.3	SPEED	820	4	100	5.3	4.8	7.2
44601	42.8	-40.7	SPEED	672	0	100	2.5	1.1	2.7
44602	44.3	-53.9	SPEED	647	0	100	2.2	0.9	2.3
44765	27.8	-44.1	SPEED	1	0	100	0.0	19.8	19.8
44811	41.1	-66.6	SPEED	1	0	100	0.0	-0.4	0.4
62502	48.7	-20.8	SPEED	652	0	100	2.0	1.0	2.2
62711	60.4	-34.7	SPEED	955	0	100	1.8	0.1	1.8
62738	58.3	-1.7	SPEED	1	0	100	0.0	2.4	2.4
62801	45.2	-5.0	SPEED	1	0	100	0.0	-1.1	1.1
62805	55.0	-12.7	SPEED	1	0	100	0.0	-0.4	0.4
64845	59.1	-11.4	SPEED	1	0	100	0.0	-6.1	6.1
945138	49.5	-65.8	SPEED	1	0	100	0.0	3.2	3.2

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
WIND DIRECTION									
13503	22.5	-29.4	DIRN.	8	13	0	12.8	22.6	26.0
41501	21.1	-54.0	DIRN.	3	0	0	3.9	26.4	26.7
41503	20.5	-41.6	DIRN.	526	0	0	9.4	13.8	16.7
41522	18.7	-42.2	DIRN.	558	0	0	9.1	0.6	9.1
41528	15.4	-60.5	DIRN.	2	0	0	7.1	39.3	39.9
41556	20.5	-81.0	DIRN.	58	7	0	29.3	-21.2	36.2
41559	23.1	-71.1	DIRN.	583	0	0	16.2	18.0	24.3
41561	22.3	-56.7	DIRN.	526	0	0	15.3	-8.5	17.5
41563	21.4	-53.9	DIRN.	578	0	0	19.6	3.6	19.9
41625	24.9	-52.3	DIRN.	8	0	0	6.3	28.6	29.3
41647	29.8	-73.4	DIRN.	272	0	0	16.4	3.3	16.7
41648	25.6	-68.1	DIRN.	372	0	0	14.4	33.2	36.2
41649	11.1	-45.9	DIRN.	516	0	0	15.4	-14.9	21.4
41652	26.8	-68.3	DIRN.	467	7	0	19.7	-4.2	20.1
44601	42.8	-40.7	DIRN.	519	0	0	20.4	4.9	20.9
44602	44.3	-53.9	DIRN.	346	0	0	20.5	3.4	20.8
44765	27.8	-44.1	DIRN.	1	0	0	0.0	-77.3	77.3
62502	48.7	-20.8	DIRN.	410	0	0	19.6	-11.0	22.5
62711	60.4	-34.7	DIRN.	637	0	0	18.8	-1.5	18.8
62738	58.3	-1.7	DIRN.	1	0	0	0.0	23.6	23.6
62801	45.2	-5.0	DIRN.	1	0	0	0.0	3.2	3.2
62805	55.0	-12.7	DIRN.	1	0	0	0.0	-12.7	12.7

TABLE 9

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: July 2002

Monitoring procedures:

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :40°N - 70°N, 60°W - 0°W.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :300.0 - 150.0 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored :N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP ≥ 20

NB : All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAL	1210	1	8	2.2	0.5	1080	1	5	0	7.7	0.5
ACA	1657	1	2	1.7	-0.1	1543	0	3	0	6.6	0.5
AEA	154	1	2	1.1	0.2	43	0	2	0	5.4	0.2
AEL	245	0	12	1.6	-0.8	195	0	14	0	5.7	-0.3
AFL	367	4	10	2.4	0.6	326	0	6	0	7.6	1.1
AFR	925	0	8	1.6	0.2	735	0	10	0	6.5	0.3
AIS	101	0	12	1.3	-0.4	102	0	15	0	6.8	-0.1
AJM	301	0	1	1.2	-0.3	249	0	4	0	8.4	0.9
AMM	91	0	9	2.0	0.6	66	0	8	0	7.6	-0.4
AMX	206	1	4	1.7	0.2	133	0	6	0	8.6	-0.3
AZA	487	1	10	2.0	0.1	431	0	6	0	7.3	0.5
BAF	21	0	0	1.6	-1.1	21	0	0	0	5.2	0.9
BAL	102	0	12	1.2	0.3	90	0	14	0	7.5	1.0
BAW	624	1	7	1.7	-0.6	609	0	7	0	6.6	0.6
BSK	32	0	9	2.4	0.1	32	0	22	0	15.3	2.6
BWA	50	0	4	1.4	0.5	27	0	15	0	8.6	-0.6
CFC	20	0	10	1.6	0.2	20	0	15	0	6.3	-1.1
CFG	334	1	1	1.4	-0.8	281	0	3	0	6.8	0.2
CGA	33	0	0	0.9	-0.1	32	0	0	0	3.5	0.8
CGF	23	0	4	1.1	-0.3	22	0	5	0	3.8	1.1
CGH	91	0	0	1.2	0.1	87	0	3	0	6.2	0.6
CLX	269	0	1	1.7	-0.1	248	0	2	0	7.1	-0.1
COA	164	1	15	1.0	-0.1	105	0	21	0	5.5	0.8
CRL	408	0	4	1.3	0.2	305	0	10	0	9.5	-0.3
CTM	22	0	14	2.4	-0.4	22	0	14	0	8.8	-0.4
CUB	183	2	6	1.4	0.2	142	0	7	0	7.6	0.9
DAB	79	0	5	1.2	-0.1	77	0	5	0	3.9	1.3
DAI	104	0	0	1.0	0.2	98	0	0	0	3.9	0.7
DAL	1055	0	16	1.3	-0.3	928	0	17	0	6.8	0.2
DBR	38	0	8	1.7	-0.8	40	0	8	0	6.1	0.1
DCE	132	0	14	1.0	0.3	113	0	16	0	6.0	-0.9
DLH	928	0	10	1.5	0.1	878	0	11	0	6.8	0.7
EDW	48	0	6	1.7	-0.2	45	0	4	0	6.9	1.2
EIA	163	1	12	1.7	-0.3	155	1	100	0	21.3	5.3
ELY	211	0	2	1.6	0.0	210	0	2	0	6.8	0.6
ETH	56	0	9	0.8	0.1	58	0	12	0	7.7	0.4
EWW	127	0	6	1.7	0.2	120	1	10	0	9.7	0.0
FDX	905	0	35	1.4	0.2	912	0	35	0	8.5	0.9
FGS	60	0	0	1.3	0.3	59	0	0	0	3.6	0.8
FGZ	24	0	0	1.3	0.2	23	0	0	0	5.0	1.4
FIN	373	0	2	1.6	0.3	343	0	3	0	6.3	0.7
GAF	38	0	3	2.0	-1.0	39	0	0	0	5.1	1.5
GCO	192	1	6	1.5	0.0	191	0	100	0	17.2	3.6
GRL	55	0	2	1.9	0.1	40	0	0	0	5.0	1.0
GTI	168	0	8	2.0	-0.3	169	0	10	0	8.2	1.2
GWW	48	0	2	1.0	0.0	44	0	2	0	4.0	-0.3
IBE	1020	1	8	1.5	0.4	601	0	12	0	6.6	0.8
ICE	967	0	3	1.6	0.0	901	0	4	0	7.5	0.9
IWD	68	0	3	2.1	0.0	22	0	0	0	5.1	-0.5
JMC	51	2	8	1.1	-0.1	50	0	16	0	10.4	2.1
KLM	1071	0	3	1.5	0.1	842	0	2	0	6.6	0.4
LDA	24	0	17	1.1	0.2	22	0	18	0	6.5	-0.1
LDI	314	1	6	1.5	-0.8	240	0	8	0	7.7	0.2
LIB	305	1	12	1.6	0.7	171	0	12	0	9.2	1.2
LOT	131	0	3	1.8	-1.0	111	0	4	0	5.3	0.9
LTU	504	1	7	1.6	0.2	398	0	7	0	6.9	0.7
LXR	63	0	8	1.5	0.3	49	0	16	0	9.8	0.9
MON	37	0	5	2.1	0.0	21	0	10	0	9.4	0.3
MPD	172	1	2	1.5	-0.5	88	0	3	0	6.7	0.2

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
MPH	440	0	3	1.6	-0.7	396	0	4	0	8.0	0.4
MYT	227	0	3	1.5	0.0	200	0	5	0	8.1	0.3
NCA	36	0	0	1.8	0.1	29	0	0	0	6.0	1.1
NWA	3793	0	3	1.7	0.4	3738	0	4	0	7.4	0.5
PAC	123	1	5	2.0	0.3	125	0	6	0	6.4	-0.5
RAM	255	1	2	1.4	0.3	144	0	4	0	7.2	0.7
RCH	114	0	100	3.2	-0.5	112	0	100	0	14.4	2.8
RJA	62	0	2	1.6	-0.1	62	0	10	0	11.1	1.2
RRR	103	1	9	1.9	0.0	95	0	8	0	6.5	1.1
RZO	152	1	7	2.9	1.5	114	1	6	0	7.2	0.1
SLR	129	0	12	1.1	-0.1	107	0	15	0	7.6	0.1
SSV	66	0	2	1.8	-0.3	69	0	6	0	8.5	-0.1
SVA	56	2	11	1.7	0.8	54	2	13	0	6.4	1.5
TAG	21	0	0	1.8	1.0	22	0	55	0	8.6	0.4
TAP	320	0	4	1.4	-0.1	159	1	9	0	9.3	0.5
THT	36	3	6	1.7	0.0	35	0	6	0	7.2	1.1
TPA	28	0	4	1.0	0.4	28	0	0	0	4.6	-0.4
TSC	172	2	2	1.4	0.3	150	0	5	0	7.5	1.5
UAL	306	1	68	1.7	-0.9	356	0	68	0	9.1	0.6
UPS	1144	0	42	1.9	0.4	1131	0	42	0	8.2	0.9
USA	112	0	3	1.1	0.2	85	0	5	0	8.3	0.5
VIR	270	0	3	1.5	0.1	263	0	4	0	7.3	1.0
WOA	132	1	8	2.1	0.5	126	0	9	0	7.8	0.4
9VS	60	0	0	1.1	-0.2	58	0	0	0	4.2	0.9
EU	32753	0	25	1.4	0.1	32753	0	25	0	4.7	0.5
KL	485	0	17	1.6	0.8	480	0	16	0	5.5	1.0
LH	735	0	22	1.4	0.9	734	0	22	0	4.7	1.0
TN	25	0	4	2.2	1.5	29	0	10	0	8.2	0.4
N	1209	0	10	1.6	0.3	1184	0	11	0	6.3	0.8
US ACARS	47266	6	48	1.3	0.3	47266	0	44	0	5.2	0.6

TABLE 10

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: July 2002

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DASAP1	12	Z	100	6	0	11.1	18.0	14.2
DASAP3	12	Z	100	2	0	11.0	24.6	22.0
DBBH	00	Z	100	17	0	14.1	37.4	34.6
DBBH	12	Z	100	20	0	17.9	40.2	36.0
DBLK	00	Z	100	1	0	0.0	29.0	29.0
DBLK	12	Z	100	16	0	8.5	31.1	29.9
ELML7	00	Z	100	18	0	16.6	34.5	30.2
ELML7	12	Z	100	19	1	21.8	43.7	37.8
FNOR	00	Z	100	8	0	14.5	14.9	3.3
FNOR	12	Z	100	10	0	9.9	18.2	15.3
FNOU	00	Z	100	3	0	15.1	16.9	7.7
FNOU	12	Z	100	4	0	10.6	12.3	6.3
FNPH	00	Z	100	12	0	34.5	34.5	-1.0
FNPH	12	Z	100	11	0	11.9	15.1	9.2
FNRS	00	Z	100	10	0	10.5	10.7	2.3
FNRS	12	Z	100	10	0	11.2	20.2	16.8
LDWR	00	Z	100	26	0	13.8	27.3	23.5
LDWR	12	Z	100	28	0	14.0	19.4	13.3
OVYA2	00	Z	100	3	0	9.7	13.4	9.3
OVYA2	12	Z	100	5	0	11.3	16.3	11.8
OXYH2	00	Z	100	7	1	11.3	32.3	30.3
OXYH2	12	Z	100	9	0	5.6	27.3	26.8
SWJS	00	Z	100	6	0	12.3	55.2	53.8
SWJS	12	Z	100	4	0	7.6	40.5	39.8
V2XO	00	Z	100	3	3	4.9	53.2	53.0
V2XO	12	Z	100	7	2	76.9	77.1	-4.4
WPKD	00	Z	100	5	0	3.9	23.7	23.4
WPKD	12	Z	100	5	0	82.8	84.3	-15.6
ZCBP6	00	Z	100	6	0	8.1	28.2	27.0
ZCBP6	12	Z	100	8	0	26.5	57.6	51.1
03953	00	Z	100	30	0	11.2	40.3	38.7
03953	12	Z	100	31	0	18.6	46.2	42.3
04018	00	Z	100	29	0	11.0	31.5	29.5
04018	12	Z	100	31	0	11.4	26.2	23.6
04220	00	Z	100	30	0	7.0	27.7	26.8
04220	12	Z	100	31	0	7.9	25.4	24.2
04270	00	Z	100	28	0	10.2	18.4	15.3
04270	12	Z	100	30	1	10.4	22.5	19.9
04339	00	Z	100	30	0	7.7	27.7	26.6
04339	12	Z	100	30	0	6.2	28.6	27.9
04360	00	Z	100	30	0	12.3	22.7	19.1
04360	12	Z	100	29	2	7.9	23.3	21.9
08001	00	Z	100	27	0	23.8	30.0	18.2
08001	12	Z	100	29	1	21.4	23.1	8.5
08508	12	Z	100	29	0	13.5	42.0	39.7
08522	00	Z	100	29	0	6.3	37.3	36.8
08522	12	Z	100	31	0	16.0	39.9	36.6
08594	12	Z	100	22	0	18.7	24.1	15.2
60020	00	Z	100	30	0	9.5	41.4	40.3
60020	12	Z	100	30	0	10.9	39.3	37.8
71600	00	Z	100	30	0	11.0	19.1	15.6
71600	12	Z	100	31	0	15.0	22.4	16.6
72201	00	Z	100	30	0	12.2	65.9	64.8
72201	12	Z	100	31	0	15.5	69.1	67.3
72402	00	Z	100	30	0	17.7	69.1	66.8
72402	12	Z	100	31	0	18.0	68.5	66.1
74494	00	Z	100	26	0	16.1	34.6	30.6
74494	12	Z	100	27	0	10.7	15.8	11.6
78016	00	Z	100	28	0	12.0	33.3	31.1
78016	12	Z	100	29	0	12.8	34.1	31.6

TABLE 11

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: July 2002

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DASAP1	12	Z	500	6	0	11.9	14.0	-7.3
DASAP3	12	Z	500	2	0	8.0	8.1	-1.0
DBBH	00	Z	500	18	0	8.5	10.2	5.7
DBBH	12	Z	500	21	0	7.2	7.2	-0.8
DBLK	00	Z	500	1	0	0.0	10.0	10.0
DBLK	12	Z	500	16	0	5.9	17.2	16.1
ELML7	00	Z	500	20	0	11.8	12.0	1.8
ELML7	12	Z	500	24	0	15.7	19.1	10.8
FNOR	00	Z	500	12	0	6.9	7.5	2.9
FNOR	12	Z	500	13	0	6.1	9.3	7.0
FNOU	00	Z	500	3	0	4.6	4.8	-1.3
FNOU	12	Z	500	4	0	3.1	3.4	1.3
FNPH	00	Z	500	13	0	18.8	19.1	3.5
FNPH	12	Z	500	11	0	9.0	9.0	0.5
FNRS	00	Z	500	11	0	4.3	4.3	-0.5
FNRS	12	Z	500	12	0	6.9	7.0	0.9
LDWR	00	Z	500	30	0	9.1	14.4	11.1
LDWR	12	Z	500	30	0	7.9	8.6	3.4
OVYA2	00	Z	500	3	0	6.6	10.9	8.7
OVYA2	12	Z	500	5	0	9.7	10.6	4.2
OXYH2	00	Z	500	7	1	6.1	16.7	15.6
OXYH2	12	Z	500	9	0	7.8	17.8	16.0
SWJS	00	Z	500	6	0	3.0	18.1	17.8
SWJS	12	Z	500	5	0	8.5	17.9	15.8
V2XO	00	Z	500	7	0	32.2	47.7	35.3
V2XO	12	Z	500	9	1	39.1	51.4	33.3
WPKD	00	Z	500	5	0	9.6	12.9	8.6
WPKD	12	Z	500	5	0	39.1	39.7	-6.6
ZCBP6	00	Z	500	7	0	5.8	6.7	3.3
ZCBP6	12	Z	500	8	0	13.5	21.3	16.5
03953	00	Z	500	30	0	7.3	14.7	12.7
03953	12	Z	500	31	0	8.6	19.0	17.0
04018	00	Z	500	30	0	8.9	17.1	14.6
04018	12	Z	500	31	0	8.6	14.6	11.7
04220	00	Z	500	30	0	8.8	16.6	14.1
04220	12	Z	500	31	0	10.7	12.9	7.4
04270	00	Z	500	30	0	8.6	13.9	11.0
04270	12	Z	500	30	1	7.6	13.6	11.3
04339	00	Z	500	30	0	6.6	19.8	18.7
04339	12	Z	500	31	0	5.9	17.7	16.7
04360	00	Z	500	30	0	7.5	9.8	6.3
04360	12	Z	500	29	2	8.5	10.3	6.0
08001	00	Z	500	30	0	13.2	13.6	-3.0
08001	12	Z	500	30	1	11.8	11.8	-0.6
08508	12	Z	500	30	0	6.2	11.3	9.5
08522	00	Z	500	30	0	5.3	9.8	8.2
08522	12	Z	500	31	0	6.9	12.5	10.4
08594	12	Z	500	25	0	11.1	13.0	-6.7
60020	00	Z	500	30	0	8.5	9.8	4.9
60020	12	Z	500	30	0	6.7	11.2	9.0
71600	00	Z	500	30	0	7.1	8.8	-5.3
71600	12	Z	500	31	0	12.3	12.6	2.6
72201	00	Z	500	30	0	4.9	15.1	14.3
72201	12	Z	500	31	0	8.6	13.5	10.4
72402	00	Z	500	30	0	8.2	16.2	14.0
72402	12	Z	500	31	0	8.8	12.7	9.1
74494	00	Z	500	26	0	8.7	9.4	3.4
74494	12	Z	500	27	0	6.3	8.0	4.9
78016	00	Z	500	28	0	5.4	11.2	9.9
78016	12	Z	500	31	0	8.4	14.2	11.5

TABLE 12

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: July 2002

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DASAP1	12	V	100	5	0	0	2.6	0.5	1.5
DASAP3	12	V	100	2	0	0	3.9	-0.2	3.6
DBBH	00	V	100	17	0	0	6.8	0.4	-0.4
DBBH	12	V	100	19	0	0	7.7	-1.5	1.3
DBLK	00	V	100	1	0	0	0.3	0.3	-0.1
DBLK	12	V	100	18	0	0	2.6	-0.5	0.5
ELML7	00	V	100	18	0	0	3.9	-0.2	-0.3
ELML7	12	V	100	19	0	0	4.7	-0.7	1.7
FNOR	00	V	100	8	0	0	3.7	0.7	-0.2
FNOR	12	V	100	12	0	0	3.6	-0.2	-0.3
FNOU	00	V	100	4	0	0	3.6	-1.4	1.1
FNOU	12	V	100	4	0	0	3.8	0.2	-1.5
FNPH	00	V	100	11	0	0	4.8	0.7	2.3
FNPH	12	V	100	12	0	0	3.8	0.2	0.6
FNRS	00	V	100	10	0	0	3.8	1.2	0.4
FNRS	12	V	100	10	0	0	4.5	-0.3	0.2
LDWR	00	V	100	26	0	0	1.8	0.4	-0.1
LDWR	12	V	100	28	0	0	1.8	0.1	0.3
OVYA2	00	V	100	3	0	0	7.3	-0.7	4.2
OVYA2	12	V	100	5	0	0	2.2	0.3	0.6
OXYH2	00	V	100	8	0	0	1.7	0.7	0.1
OXYH2	12	V	100	9	0	0	2.8	0.0	-0.1
SWJS	00	V	100	4	0	0	5.3	-1.3	0.9
SWJS	12	V	100	2	0	0	4.2	0.9	2.7
V2XO	00	V	100	6	0	0	3.4	0.1	1.2
V2XO	12	V	100	7	0	0	2.4	1.3	0.1
WPKD	00	V	100	5	0	0	2.3	-0.8	0.5
WPKD	12	V	100	5	0	0	3.5	2.3	1.0
ZCBP6	00	V	100	6	0	0	2.2	0.1	0.7
ZCBP6	12	V	100	5	0	0	3.3	-0.8	-1.3
03953	00	V	100	29	0	0	2.3	0.1	0.1
03953	12	V	100	31	0	0	2.4	0.2	0.8
04018	00	V	100	29	0	0	2.7	0.3	0.4
04018	12	V	100	31	0	0	2.7	0.6	0.1
04220	00	V	100	30	0	0	2.3	-0.1	0.0
04220	12	V	100	31	0	0	2.3	0.0	0.0
04270	00	V	100	27	0	0	3.5	-0.5	0.0
04270	12	V	100	29	0	0	3.8	1.7	0.4
04339	00	V	100	26	0	0	4.0	0.3	-0.3
04339	12	V	100	30	0	0	3.7	0.5	0.4
04360	00	V	100	29	0	0	2.3	-0.3	0.4
04360	12	V	100	31	0	0	2.3	0.0	-0.2
08001	00	V	100	25	0	0	3.2	-0.4	-0.6
08001	12	V	100	27	0	0	3.1	-0.1	-0.3
08508	12	V	100	19	0	0	3.9	0.6	0.3
08522	00	V	100	27	0	0	4.6	-0.2	0.9
08522	12	V	100	30	0	0	4.1	0.2	-0.1
08594	12	V	100	23	0	100	4.2	-1.3	-1.8
60020	00	V	100	30	0	0	5.1	-1.5	0.2
60020	12	V	100	30	0	0	4.2	-0.3	1.5
71600	00	V	100	29	0	0	3.4	-0.4	1.2
71600	12	V	100	25	0	0	3.6	0.1	1.3
72201	00	V	100	30	0	0	3.0	1.4	0.3
72201	12	V	100	31	0	0	2.7	0.3	0.4
72402	00	V	100	30	0	0	3.3	-0.7	-0.2
72402	12	V	100	31	0	0	3.6	-0.3	0.9
74494	00	V	100	25	0	100	3.0	-0.6	0.2
74494	12	V	100	26	0	100	2.0	-0.5	0.6
78016	00	V	100	28	0	0	4.5	1.4	1.0
78016	12	V	100	29	0	0	3.6	-0.9	0.3

TABLE 13

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: July 2002

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS:	Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DASAP1	12	V	500	4	0	0	2.1	-0.6	0.7
DASAP3	12	V	500	1	0	0	3.2	0.0	3.2
DBBH	00	V	500	18	0	0	4.1	1.8	0.5
DBBH	12	V	500	19	0	0	3.4	1.3	-0.1
DBLK	00	V	500	1	0	0	0.9	-0.6	0.6
DBLK	12	V	500	19	0	0	3.0	1.0	0.9
ELML7	00	V	500	19	0	0	2.8	-0.4	1.1
ELML7	12	V	500	24	0	0	3.9	0.0	1.8
FNOR	00	V	500	12	0	0	2.8	-0.5	0.0
FNOR	12	V	500	13	0	0	3.0	0.7	0.1
FNOU	00	V	500	4	0	0	4.0	1.1	1.3
FNOU	12	V	500	3	0	0	4.3	-3.5	0.4
FNPH	00	V	500	13	0	0	4.8	-1.2	0.8
FNPH	12	V	500	12	0	8	6.1	1.1	0.3
FNRS	00	V	500	12	0	0	3.2	-1.1	0.4
FNRS	12	V	500	12	0	0	3.9	-1.5	-0.4
LDWR	00	V	500	30	0	0	3.0	-0.5	-0.8
LDWR	12	V	500	30	0	0	3.2	-0.3	-0.4
OVYA2	00	V	500	3	0	33	11.6	-2.1	6.2
OVYA2	12	V	500	5	0	0	3.4	1.4	-1.9
OXYH2	00	V	500	8	0	0	5.2	0.3	2.0
OXYH2	12	V	500	9	0	0	3.2	-0.7	1.0
SWJS	00	V	500	4	0	0	3.5	-1.5	1.8
SWJS	12	V	500	3	0	0	5.7	1.6	-0.4
V2XO	00	V	500	6	0	0	2.7	1.2	0.2
V2XO	12	V	500	8	0	0	2.8	0.6	-0.2
WPKD	00	V	500	5	0	0	3.6	-1.8	2.3
WPKD	12	V	500	5	0	0	3.6	-0.3	2.4
ZCBP6	00	V	500	7	0	14	7.2	-1.8	-1.1
ZCBP6	12	V	500	4	0	0	3.6	0.7	-2.9
03953	00	V	500	29	0	0	4.1	0.6	0.3
03953	12	V	500	31	0	0	3.4	0.3	0.0
04018	00	V	500	30	0	0	3.4	0.2	0.6
04018	12	V	500	31	0	0	3.5	0.4	0.0
04220	00	V	500	30	0	0	3.3	0.6	0.0
04220	12	V	500	30	0	0	3.7	-0.1	-0.5
04270	00	V	500	29	0	0	3.5	-0.4	-0.1
04270	12	V	500	31	0	0	3.8	-1.2	-0.1
04339	00	V	500	30	0	0	4.0	-1.2	-0.7
04339	12	V	500	31	0	0	3.6	0.9	0.1
04360	00	V	500	30	0	0	4.2	-0.4	-0.9
04360	12	V	500	31	0	0	3.3	0.2	0.3
08001	00	V	500	30	0	0	5.0	0.7	0.6
08001	12	V	500	31	0	0	3.6	0.8	0.4
08508	12	V	500	20	0	0	3.6	-0.6	0.1
08522	00	V	500	30	0	0	4.1	-0.8	0.3
08522	12	V	500	31	0	0	3.0	0.0	0.3
08594	12	V	500	25	0	100	4.7	-1.7	-1.5
60020	00	V	500	30	0	0	4.8	-0.2	0.7
60020	12	V	500	30	0	0	4.2	0.4	-0.1
71600	00	V	500	29	0	0	3.1	-0.2	-0.3
71600	12	V	500	26	0	0	4.2	-0.4	1.1
72201	00	V	500	30	0	0	2.3	0.5	-0.5
72201	12	V	500	31	0	0	2.8	-0.6	-0.1
72402	00	V	500	30	0	0	3.1	0.9	-0.6
72402	12	V	500	31	0	0	2.7	0.0	0.8
74494	00	V	500	25	0	100	3.3	-0.1	0.9
74494	12	V	500	26	0	100	2.9	-0.3	0.7
78016	00	V	500	28	0	0	3.4	-0.5	0.1
78016	12	V	500	30	0	0	2.3	0.2	-0.2

APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

Level (hPa)	Windspeed m s^{-1}
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45